

THIS CHANGING WORLD

*A series of contributions by
some of our leading thinkers,
to cast light upon the pattern
of the modern world*

Edited by

J R M BRUMWELL



London 1945

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To Irene Dallas

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EDITOR'S FOREWORD

THIS CHANGING WORLD

Much of the thinking and achievement of scientists, artists, and pioneers in every activity of modern life is highly specialised, not widely understood, difficult to appreciate at first sight and indeed runs counter to what the world for centuries has called common sense. Edward Glover in his chapter of this book asks whether we have "followed Alice through the looking-glass"—C H Waddington asks whether our "commonsense" ideas are adequate in the world of today.

Progress if noticed at all nearly always at first shocks the man in the street; when Darwin publicised evolution it seemed to many both ridiculous and wicked, and directly against what they had been taught in the Bible. Now, less than 100 years afterwards, Darwin's theories are accepted by the general public as common sense and a denial would be thought absurd. Probably most of the educated public have heard of Einstein, astronomer and physicist, because when his theory came out it had a good press. Few can understand his theory completely, but many know that he does make some queer suggestions, using "queer" to mean revolutionary, against common sense and basically different from the previous universally accepted Newtonian ideas. Similarly much of modern art, music, poetry, architecture, seems not merely a development of what has gone before, but a revolution and, to the ordinary man, "queer". So it goes through the whole range of human experience. Who will deny that modern war, politics, sociology, communication, transport, almost all departments of life and thought tend to have changed not only in degree but in kind since the last century? Change is nothing new in world history, but the modern speed of change is the point.

Thinkers, especially of the younger generation, are in touch with the range of these ideas, and some see a connecting link, in that the whole trend of life and thought is undergoing a rapid transformation of which these very different developments in science, in art, and in other spheres of life are parallel symptoms. The chapters of this book originally appeared in a slightly different form as a series of articles in the monthly magazine *World Review*,

to introduce in an accessible medium some of these new*thoughts to the interested but perhaps uninformed reader.

My part has been to act as editor (which 'I have enjoyed very much), and throughout I have tried to obtain from leading thinkers, especially young ones, their ideas on the subjects in which they specialise, from the point of view expressed above. I thank them all very sincerely for their willing and helpful co-operation.

I specially thank Herbert Read who wrote the introduction and the concluding chapter, and who encouraged and assisted the whole project. Also Ben Nicholson who took a keen interest and is an inspiration to all his friends.

The project will measure its success by the extent to which it casts light upon the pattern of the modern world, helps us all to preserve an open mind, and enables us to face the sometimes strange scene of today with a gaze which is interested, enquiring and free from prejudice.

J R M BRUMWELL

The production of this book owes much to the following group Leonard Cox, Joan Frost, Donald Gardner (typographer), Grace Sandilands

THE AUTHORS

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J D BERNAL FRS

Professor of Physics at Birkbeck College, London. His experimental work has been mainly concerned with the structure of crystals, particularly those of substances which have important functions in biology, such as hormones and proteins. He is well known, however, for the breadth of his interests and the depth of his learning in many fields. A few years ago he published *The Social Function of Science*, a book which had a powerful effect on the scientists' own ideas as to how they can best contribute to the welfare of society. During the war he has held the important post of "scientific adviser to Combined Operations"

ERIC BLOM

Editor of *Music and Letters* and *Master Musicians* series. Author of *The Limitations of Music*; *Mozart*; *Music in England* (Pelican); etc.

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J G CROWTHER

Head of the Science Department of the British Council and scientific correspondent of the *Manchester Guardian*. Author of the *Social Relations of Science*; *British Scientists of the 19th Century*; *Soviet Science*; *Famous American Men of Science*; and ten other books on science. He has travelled much in the U.S.S.R., U.S.A. and the countries of Europe, in search of material about science and scientific institutions. Has lectured at Harvard University, and has lectured and broadcast much on scientific matters

C D DARLINGTON FRS

Director of the John Innes Horticultural Institution Dr Darlington has worked and lectured in Universities in U S A , Japan, Sweden and Soviet Russia, he has travelled in India, Persia and Transcaucasia He has written a book on the Evolution of Heredity which shows both evolution and heredity from a new angle

GEORGE DICKSON

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Director of London Clinic of Psycho analysis , Director of Research, Institute of Psycho analysis, London , Secretary of International Psycho Analytical Association , Director of Institute for Treatment of Delinquency, London , Editor of *Research Monograph Series, International Journal of Psycho analysis* Author of *War, Sadism and Pacifism , The Dangers of Being Human , Psycho analysis , The Technique of Psycho analysis , The Psychology of Fear and Courage* , and numerous articles and research papers on psycho-analysis and sociology

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One of our leading teachers of philosophy, has held chairs in South Africa, Manchester, Balliol College, Oxford, and University of London , a very successful broadcaster

HEART MANNHEIM

Sometime lecturer at the University of Heidelberg Head of the Department of Sociology in the University of Frankfurt Since 1933 he has been on the Staff of the London School of Economics (University of London) Editor of the International Library of Sociology and Social Reconstruction Author of the following books in English *Ideology and Utopia, an Introduction to the Sociology of Knowledge , Man and Society in an Age of Reconstruction , Diagnosis of our Time*

LEWIS MUMFORD

One of the most distinguished thinkers and writers on sociology and allied subjects of today. He is a professor and author in America, at present holding the new chair of "Humanities" in the University of Stanford, California. His two books *Culture of Cities* and *Technics and Civilisation* are two of the most important, thrilling and influential books of recent years.

JOSEPH NEEDHAM FRS

Reader in Biochemistry in the University of Cambridge. His main field of scientific work is the chemical side of animal development. He has done a great deal of experimental work, for instance, on the respiration and metabolism of embryos, and on "organisers" with C. H. Waddington. He has also published a large survey of the whole subject (*Chemical Embryology*, in 3 vols.) and a new volume, bringing the survey up to date, has recently appeared under the title *Biochemistry and Morphogenesis*. In addition, he has written a history of embryology and several books dealing with the relations between science, religion and philosophy, and other general topics. In 1943 he was appointed scientific attache to the British Embassy in China.

KATHLEEN RAINE

Poet and literary critic

E. H. RAMSDEN

Art critic, whose interest in modern art was stimulated by its development in an abstract direction, has studied both classical and oriental art and was appointed to the panel of lecturers for the Chinese Exhibition at Burlington House 1935/6.

HERBERT READ

Poet, art critic, author, philosopher and publisher. Sometime Professor of Fine Art, University of Edinburgh, editor of the *Burlington Magazine*, 1934/9. Author of *Art Now*, *Art and Industry*, etc. Director of the Design Research Unit.

JOHN SUMMERSON

Some time in the office of Sir Giles Scott, R.A., and then taught architecture for two years in Edinburgh. From 1931 to 1941 he was associated with *The Architect* in various editorial capacities and is now Deputy Director of the National Buildings Record. His books include the life of John Nash, architect of old Regent Street, and (with J. M. Richards) *The Bombed Buildings of Britain*. He has written, lectured, broadcast and televised on various aspects of architecture, chiefly historic, aesthetic and professional.

Lecturer in Zoology in Cambridge University. He has studied the processes of embryonic development in newts (where he was concerned with trying to isolate the substance which produces the "organiser" effect), in chickens (which he removed from the egg while they were still very young and kept alive in artificial cultures) and recently in fruit-flies (*Drosophila*), which are particularly favourable material for investigating the effects of hereditary factors. Besides technical papers and books, he has written a Pelican *The Scientific Attitude* and has recently published a book on *Science and Ethics* in the form of a discussion between himself and a number of well-known scientists and philosophers. During the war he has been "scientific adviser to Coastal Command"

HERBERT READ

THRESHOLD OF A NEW AGE

Renaissance or Decadence? Is there some common factor behind the contemporary manifestations of thought and life?

Evolution, revolution, progress, change—we are inevitably driven to use one or more of these words to describe the general character of the modern scene. Since the break-up of the Church at the end of the Middle Ages there has been no unity in the world. Nation has competed against nation, class against class, and man against man in the desperate effort to establish economic security. The intervals of relative stability, which we call peace, have been brief and uneasy.

No sooner had a nation attained supremacy among nations, as did Britain as a result of the Napoleonic Wars, than movements of dissension and political unrest sprang up within its boundaries.

No sooner had a class gained ascendancy, as did the mercantile class in this country during the eighteenth century, than a new class was born to express revolt against its selfishness and pride.

There have been revolts within revolts—minorities which split off and formed separate parties, bitter factions under the same banner of brotherhood, rival claims to the loyalty of the dispossessed, defeatists within the ranks of the progressive forces.

Against this agitated background all that we mean by culture—the art and philosophy, the science and the learning of our age—has shown the same restlessness. Classical canons of art have been flouted, and truths which men thought eternal have been disproved. Science has penetrated far beyond the range of the senses to reveal a world at once terrifying in its extent and majestic in its orderliness. Invention and discovery have succeeded one another with bewildering rapidity and the very habits and manners of civilised men have changed beyond recognition.

Science has taught us that underneath the shifting appearance of nature—the growth and decay of animals and plants, changes of weather and temperature, the phases of the moon and the revolutions of the planets—there is a system of law. The leaf that falls from the tree is not an isolated and meaningless event : it is a link in the eternal process. Is there a similar invisible coherence in the processes of the human mind ?

Can we discern, under our contemporary revolution of thought in science and art, in philosophy and religion, a single pattern ? Or is it all, as some people hold, in this country as well as in the totalitarian States, but an aimless anarchy of mind, a chaos that ought to be disciplined by State and Church ?

Freedom of thought, that specifically modern achievement of mankind, that liberation of the soul from convention, doubt and dread, that fearless advance into the unknown—has it merely landed us in a bog from which we can only be rescued by the re-establishment of dogma and authority ?

I, for one, answer No ! I believe that a pattern can be discerned in the interwoven fabric of our dreams and discoveries. I believe that science is gradually establishing a firm ground of absolute knowledge, and that on this ground philosophy is building an equally firm structure of thought. I believe that the bewildering changes we have seen in art represent an extension of human sensibility, a deeper intuition of the form and significance of the objective world.

But these, it will be said, are only *quantitative* changes. Granted that we possess greatly increased powers of feeling and understanding, there still remains the question : to what end have we put these powers ? Can we discern, in all this shifting of forces and quantities, this clash of armies and destruction of habits, a *qualitative* change which we can call progress ?

That is a question which people everywhere are asking now, in the midst of this greatest of all conflicts. The very magnitude of the struggle and the severity of the sacrifices which we are compelled to make force even the simple and unquestioning souls among us, hitherto content to accept their lot with humility, to give voice to that anxious query.

This book will attempt to answer their searching doubts. "Is there a pattern or is it chaos, is it empty turmoil or is it progress ?" It is not for me, in this introductory essay, to try to anticipate the points of view of the various contributors ; but I believe that

their answers will all, in some degree, be affirmative. Man is not better—he is perhaps worse—than he was five hundred years ago and it would be rash to say that he is any happier. But he has, in all his long travail, acquired new powers, new instruments of understanding, a finer sensibility.

With these new powers he stands on the threshold of a new world. Can we have the faith, which some people will call optimism, to assert that he will, in the near future, enter into possession of this new world?

In the midst of these dark days, when a resurrected and powerful barbarism seems to be trying to sweep away the last remnants of our civilisation, we are to turn to each aspect of our national and international life and examine the crowded scene and the prospects for the future.

We are to ask whether man has the power to reorganise the material conditions of his life—to create a reasonable economic system.

We are to ask whether, as an outcome of a new economic order, we may reasonably expect a new flowering of culture in the arts.

We are to ask whether this new order will include new advances in science and philosophy, and, finally, we are to ask whether, as a culmination to all these changes, our civilisation will find the spiritual coherence and moral unity which can only be given by a universal religion.

It may well be demanded: what is to be your measure of progress? In science and in technics we can assess progress by exact instruments, by proofs, and in exact terms. We have units like "horse-power", for example, which tell us that the progress between a horse-driven vehicle of the eighteenth century and a steam-engine of the nineteenth century or an aeroplane of the twentieth century has a definite mathematical ratio, expressible in certain figures. That is one kind of demonstrable progress.

We can also say that the explanations of the workings of the universe given successively by a mediæval schoolman, by Galileo, by Newton and by Einstein represent progressive stages in scientific knowledge; we can say this because we can prove by experiment that the earlier theories are wrong or inadequate compared with the later theories.

If war is to be measured by the range and destructive power of weapons, then the science of war has progressed enormously even within our own time. But can we say the same of painting and

literature, of music and architecture, of philosophy and religion, of economics and politics? Do, for instance, surrealistic painting, or modern atonal music, or abstract sculpture, represent progressive stages in artistic experience, or have they purely ephemeral significance? In these spheres we have no exact measuring rod, and experiments and statistics are of no avail. What is the measure of our cultural progress, stagnation, or decline?

There are not lacking people who say that all our measurable progress in science and technics has been won at the cost of a cultural decline. They imagine a law of compensation, which enacts that every degree of mental or intellectual satisfaction represents a diminution of spiritual strength. The less the world is a mystery, the less need is there for a *deus ex machina* to explain its workings.

But others point out that with all our scientific knowledge we only postpone the final explanation of the universe. We may understand the invisible order of matter and the laws of energy, but we are still no nearer a solution of the ultimate *Why?* the ghostly *Whither?* Deep within our hearts, if not within our minds, we refuse to be satisfied with a mechanical explanation of the universe. Especially those who believe in progress cannot believe in a mechanical universe, for machines do not progress without the intervention of a creative or inventive mind.

Or we may put it in this way: the world may well be a machine, but it is a machine which changes—which wears out, breaks down, is repaired and renewed; in short, it is a machine which betrays the presence of something not merely mechanical, of something which we must recognise as mind, and if we are given to personification, of somebody whom we might describe as the Divine Engineer.

What is above all necessary is that our view of history should be wide enough to enable us to see the ups and downs, the periods of decadence and renaissance, as part of a continuous process. Actually if we do this it becomes very difficult to take up a moral attitude towards any particular period. What we have been accustomed to condemn as a period of decadence is now seen as a necessary preparation for a new renaissance; what we deplore as a phase of intellectual stagnation is seen to be a necessary pause in the historical process during which mankind can, as it were, digest the discoveries of a previous age.



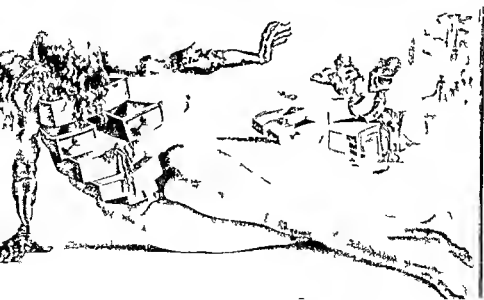
ABOVE: The famous group 'Night and Day' on the tomb of Siciliano de Medici, Florence (sixteenth century A.D.), by Michael Angelo, one of the most versatile creative artists who ever lived

BELOW: 'Brown Tube Shelter', official purchase 1940, drawing by Henry Moore, who is a modern English sculptor





For many centuries the academic ideal prevailed represented by Canova's *Sleeping Nymph* (1821-2)—Surrealism represented by Dalí's nightmarish drawing integrates this ideal in a manner which forces on us the question: Where do we go from here?





THE HERO ACROSS THE AGES In keeping with a changing philosophy of life the artist's conception of the hero changes (1) Religious Piety (detail from the Nativity by Piero della Francesca 1416-1492) (2) Military Glory (Napoleon Buonaparte by J. A. Gros 1771-1835) (3) The Successful Business Man (Lord Leverhulme by Philip A. de Laszlo 1924)

In no sphere of human life is this organic interplay of decay and renewal so evident as in the plastic arts. The Gothic period was a great positive age of creative activity, and some of us think that the twelfth century, the century of the great cathedrals, represents a peak in the artistic achievements of the human race. But can we for a moment contemplate a world in which the art of the twelfth century became stabilised, a constant product of the human race in all the succeeding centuries? No; we may regret the disappearance of Gothic art, but in the same breath we must welcome the new art of the Renaissance; and when that art in its turn changes and decays, we must turn to the succeeding years with expectant and unprejudiced eyes.

The Renaissance has, perhaps, been an unconscionable time in dying; after its hey-day it passed through the phases of baroque, rococo, neo-classicism, and finally relapsed into the academic nostalgia which is still with us.

But all these new styles, baroque and rococo and the rest, were evidence of persisting life, and presently they fused into a world-wide ferment which we call the Romantic Movement in the arts, but which is merely part of that immense renewal of human faith and courage which had its political counterpart in the French Revolution, in the rebirth of democracy, in the creation of a new world of freedom in America.

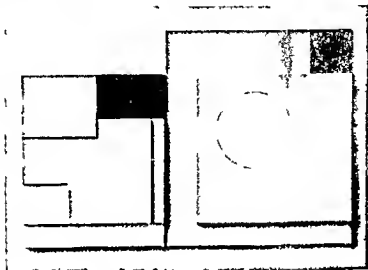
In the arts that process of renewal which began only one hundred and fifty years ago is still active. What we call the modern movement in the arts was not invented the day before yesterday in Paris or Moscow: it began with the poetry of Wordsworth and Shelley, the paintings of Constable and Turner, the architecture of the Forth Bridge and the Crystal Palace, the philosophy of Hegel and the economics of Marx.

In all these arts, and in all the sciences, movements began then which have not yet exhausted themselves, and which cannot now be stopped, even by the insane reactionaryism of a Hitler. In the course of time they will work themselves out and after a period new movements will arise.

But what we must realise—and it is the purpose of this book to help the reader to such a realisation—is that, at the critical historical moment in which we live, the vital movements of renewal which began with the French Revolution and the Romantic

ART OF A NEW AGE

Extremes of change in art are illustrated by these two reliefs, one from the base of an ancient statue in the National Museum Athens, the other in the Museum of Modern Art, New York, the work of a modern artist, Ben Nicholson. But underneath their apparent differences, is there perhaps an unchanging harmony which is the secret of the eternal values of great art?



TRANSFORMATION IN SCIENCE



Modern physicists tell us that these two photos show

1. **ELECTRONS** (one of the smallest particles from which the universe is constituted) behaving as tiny lumps of substantial matter like microscopic billiard balls

2. **Similar electrons** behaving as waves, i.e. just vibration with no substance. For a fuller scientific explanation of these pictures, see p. 66

Do these two conceptions contradict each other? Of course they do. Is one true—the other a mathematical fiction? The scientists say both are true. This and other scientific surrealism puzzles us now, but will, in the new age, no longer seem inexplicable, although no doubt new problems just as fascinating will arise

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But what we must realise—and it is the purpose of this book to help the reader to such a realisation—is that, at the critical historical moment in which we live, the vital movements of renewal which began with the French Revolution and the Romantic Movement are by no means played out. They have not yet reached their apogee, and when once the present threat to all

progress is defeated, they will renew their vital manifestations in the necessary era of reconstruction

In the midst of war it may seem that certain movements which excited the public imagination before the war have been eclipsed. What has become of movements in art like surrealism and constructivism? Has functional architecture come to a standstill? Is anything new happening in science, literature and philosophy? This book will attempt to answer such questions, but we can say now that none of these movements is dead. They may not be in the public eye—they may, like architecture, be suspended for lack of materials or frustrated by obsolete conceptions of finance. But the individuals in whom the spirit of modernism is embodied still survive, still work, still create—however obscurely and intermittently. When the cloud of war has passed, they will re-emerge eager to rebuild the shattered world.

Their experience of war will not have left them indifferent. They will have suffered and endured with all their fellow citizens, and perhaps they will be less exclusive and less intolerant in the new world. They will say: our world is in ruins, it needs not only hard work and perseverance to rebuild it, but also skill and vision. We are scientists and we believe we have the skill—we are artists and we believe we have the vision. Let us direct your work and we promise you that out of the ruins a better world will emerge. This may seem like empty optimism, for, as Shelley wrote, 'prophecies of war, and rumours of wars, etc., may safely be made by poet or prophet in any age, but to anticipate however darkly a period of regeneration and happiness is a more hazardous exercise of the faculty which bards possess or feign.' But the same Shelley went on to declare with visionary conviction

" Another Athens shall arise,
And to remoter time
Bequeath, like sunset to the skies,
The splendour of its prime "

We share Shelley's faith—our faith is the same faith, carried like a bright torch through the intervening dark years. But before we can be entrusted with a practical rather than a prophetic role, we must reach a mutual understanding with the people we would presume to lead. As poets and painters, scientists and architects, we cannot lower our standards—we cannot set up our desks and easels in the market place, along with cobblers and tinkers—we need a certain degree of seclusion and retirement. But we must

realise that when the day's work is done we are one with the cobblers and tinkers, all essential strands in the fabric of society. When the workshops and studios are closed, we must all mingle in one community and discuss our work and common task, which is the building of a new world. There must be a complete openness and interchange of views, a complete identity of interests and ideals.

How is such a unity of outlook to be achieved? We have dismissed for ever all forms of authoritarian discipline imposed from above. What we need is something *on the level*, some principle of growth that does not conflict with our democratic way of life. Such a principle must be found in our educational system.

I have not so far mentioned this important sphere of human activity, but education too has its new ideals. Indeed, in no sphere of human activity has the process of change been so active in the past two hundred years. Rousscau, Pestalozzi, Froebel, Montessori, Dewey, Dalcroze, Cizek—these names represent stages in a revolutionary movement which has changed education from a coercive and repressive discipline into a liberating and remedial nurture.

This is perhaps the most fundamental revolution of all, but still more has to be done. The life of the school and the university is still too narrow and pedantic. We must make the school a microcosm of society, so that every child goes out into the world filled not so much with learning as with a sense of human values.

One of our greatest needs—perhaps the greatest of all—is a new conception of the teacher's vocation. The schoolmaster must go the way of all taskmasters and tyrants, and in his place we must put a creative artist whose material is the most precious and the most plastic of all materials—the infant soul.

Education for freedom—that is the most exacting of all our tasks. At present the seed of life may fall on rich or stony ground ; its growth is either distorted by chance or pruned and trained into a conventional pattern. We want the plant to grow, not haphazardly, not in tropical luxuriance, but in natural perfection—with that due measure of stress which makes the growth tough and hardy, but also in the light and warmth which make the roots strong and the branches wide.

What most people hanker after is not progress, but self-satisfaction ; not change, but comfort ; not progress, but stability. But there is nothing in the history of the world, nor in the make of the

universe, to suggest that this ideal is anything but a pitiful illusion. The essence of life is change, and change implies a continuous alternation of dissolution and renewal, of growth and decay, of joy and suffering. But when night and day, storm and calm, have passed, and all the agitation of history is quiet at last, I believe something remains. Art remains. The great work of art, whether it be a temple or a poem, a piece of sculpture or a system of philosophy, is exempt from change. It is irrefragable and eternal, towering in its beauty, exquisite in its strength.

To create works of art is, therefore, to add to the permanent possessions of mankind. Art accumulates, and the increased measure of joy and the deeper purgation of suffering which we derive from this growing treasury is the true evidence of mankind's progress.

J D BERNAL, F R S

TRANSFORMATION IN SCIENCE

A general picture of the modern scene as seen by the scientist

One of the paradoxes of the present time is that people may be able to change the world so rapidly that they fail to understand what they are doing. Another is that, while more has been found out at large and in detail about nature and man in the past thirty years than in the whole of history, there is less general appreciation of this knowledge and worse use of it than ever before. This is partly because modern science has become more complex, but as much because it has been professionalised. Since some people are paid to understand it, why should the rest bother their heads about it? But ignorance of science means a failure to understand the factors underlying the critical events of our time. The history of the last few years should have shown that it is no longer optional, but absolutely necessary, for science to be understood, appreciated and effectively used.

The war is simply an acute phase of a process that has been going on with increasing violence for many years. The whole of human society is passing through an enormously important transformation. The material bases of this transformation are the changes in production which are inseparably linked with science. It is taking place far more rapidly than any of the transformations that occurred in the past; so much so, that individuals seeing overwhelming changes in their own lifetime are utterly bewildered and are carried along, without ever understanding the underlying factors. The old men, who in most parts of the world still nominally direct affairs, have by tradition and education no knowledge of the tremendous forces that are shaking the world today. They know little or nothing of modern science or economics, and are powerless either to keep out of dangers or to extricate their countries from them. Their younger successors in

the Fascist countries are equally ignorant of the facts of science, but appreciate far better its practical possibilities, and know well how to use it for destructive ends.

The tragedy of the present struggle is that the ends for which people are striving—food, work, security and freedom—are gifts which science has put within reach of all. The resources, the knowledge and the ability to build a new world are there, but instead we have danger and bloodshed, want and misery. If people could understand at least something of the possibilities which science offers, they would become more reasonably impatient of their present state, and more capable of changing it. For this, science needs to be expounded, and expounded in a new way which emphasises its relation to this changing world. It is no use any longer attempting to present science as a series of pictures of the beauties or the mysteries of the universe and of nature. People have had enough of that already; it belongs to a time when individual and social security and the general running of society could be taken for granted. Indeed, the public is very justifiably irritated with the idea of the pure scientists' leisurely and secluded search after minute and remote things, when the world all around is being bombed to pieces; especially as the aeroplanes, guns, tanks and other engines of destruction seem to be the most noticeable products of scientific research.

But in any case the scientists themselves are no longer anxious to present a merely academic picture of a disinterested search after truth combined with a sublime indifference to the results of discoveries. Science has long been much more than this. It has become an integral part of productive industry and agriculture, it maintains health, it is increasingly involved in business administration and government. The methods and ideas of science are the dominant forms of thought and action in our time.

The difficulty of getting hold of modern science is that it is moving so fast. In the past fifty years, and even more in the last twenty, it has achieved an internal revolution. Herbert Read, in Chapter 1, is quite right in tracing the parallel between the revolutionary movements in art and science, but in my view he takes in too broad a sweep. Although twentieth-century science rests securely on bases laid down in the nineteenth century, the twentieth century has a character all its own; and the revolution in science is, in fact, far more significant than that which occurred at the end of the eighteenth century.

The 100-in reflector at Mount Wilson
Here the massive telescope dominates the
rest of the structure which has been
planned entirely to house it. The human
element is subordinated to the scientific



In Greenwich Observ-
atory in the 17th cen-
tury. This is hardly
more than an ordinary
room in which a few
simple instruments are
used by gentlemen of
leisure.

Four great internal changes in science occurred just before the beginning of the century—the quantum theory, which has led to the understanding of the structures and actions of atoms and molecules, and thus to the complete union between physics and chemistry, the rise of bio-chemistry, which has revealed the extraordinarily complex but understandable chemical basis of living organisms, and shown that this is far more significant than the grosser forms and movements that occupied the naturalists of the nineteenth century, the discovery of the material basis of inheritance in the chromosomes, and finally, that ill defined but

vitaly important advance in the study of animal and human behaviour which is beginning to break down the last stronghold of metaphysics, the conception of an independent category of mind.

Now these great advances, actually incomparably richer than those in the whole previous history of science, are also essentially different in character. In recognising them, the scientists have been forced to adopt new mental attitudes which involve a break with the traditions of thought reaching as far back as the Greeks, if not farther. The simple logic of the schools derived from grammar and commonsense has been found inadequate to cope with the more remote complexities of the atom and the starry universe. Relativity and the quantum theory both involve what seems to the common man absurdities and contradictions ; but these contradictions are now established as necessary parts of the behaviour of our universe.

We see now that what we call commonsense is just a convenient but crude human tool, suitable enough for a simple life, but needing to be refined and extended to use the new knowledge effectively in a complex situation. It is in respect of its apparent absurdities and contradictions that modern science shows its relation to modern tendencies in art. By breaking with tradition the new painters and poets have greatly enlarged our sensuous and imaginative experience, and it is no accident that in their imagery and form they draw so much on science.

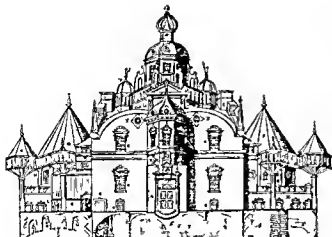
Another crucial advance is that modern science has come up against the behaviour of organised systems, not necessarily always living ones, and is forced to recognise that the very existence of organisation implies properties in the whole which are not separately evident in the parts. Chance events on one level appear as statistical laws on another. The high degree of isolation and independence that marked Newton's science is now giving way to the study of group and co-operative phenomena. The ideas of Marx and Engels, which foreshadowed this development a hundred years ago, are now being studied and appreciated far better than they were in their own time. Further, all parts of science are seen to be much more closely related to each other ; and the tendency is to even closer relationship. This implies new problems of organisation in science, and intercommunication between the various branches. The old isolation of the specialists is rapidly breaking down. Team-work is taking the place of individual and competitive attack on problems.

With all of this comes an increasing dependence on the world outside science. In the first place, the very growth of scientific work has turned science from a spare time occupation of a few dozen gentlemen of leisure, into the whole-time job of some hundreds of thousands of research workers in nearly every country of the world. Science has become an industry, a small, but key industry. The cost of scientific research is borne directly or indirectly by industrial contributions, and already there are far more scientists working for industry than in universities or independent institutes. The very progress of science itself would be quite impossible without that of industry. The great discoveries of the present century were made possible by the industrial application of nineteenth-century discoveries. Without the mechanical technique or the ready availability of instruments of the chemical and electrical industries, modern physics and chemistry could not exist.

Through its connection with industry if for no other reason, modern science is inevitably affected by external political and economic trends. The growth of monopolies has made possible the creation of well-endowed scientific research institutes, but the restrictive policy which followed the economic crisis of 1930 was strongly felt in the scientific world, and gave rise to serious doubts and questionings. The old nineteenth-century optimism of science, the idea that its application automatically led to ever-increasing progress, was found no longer tenable. But what was to take its place?

The war has given a terrible urgency to the problem of the proper relation of science to human affairs. It turns out that although science has been used very largely for the development of weapons, it is needed no less urgently for the problem of preserving the life and health of the population under the most difficult circumstances, for providing food and shelter and checking disease. This brings to the foreground the essential function of science, which is in the first place to find the means of satisfying the most elementary human needs. What is seen as a necessity in war, was no less a necessity in peace. If the function of science had been fully realised then, the want and misery which led to the war would have been removed without the need for a struggle that can only waste human resources and destroy the powers of human thought.

But it is clearly not sufficient to state this. In fact, it was stated



Tycho Brahe's observatory, Uraniborg, near Copenhagen. The first laboratory, built and used by a 16th century nobleman

over and over again before the war to little effect. There were reasons, and very weighty reasons, why science could not be used for human betterment before the war. Those reasons still remain, and the way to remove them will only be found when they are understood. So the scientist was forced, and is being forced, to try to understand the conditions moulding society and determining the resistance to rational schemes of betterment.

We may find reflected inside the world of science the same general trends as are seen in the arts and in politics. In the first place, there are those who, disliking intensely the present state of affairs, see in it only the culmination of the application of science. The solution to them is to abolish the present and go back to the comparative happiness of an ignorant past. Their appeal is to religion, to the values of the land and the family. These are the views which were put forward with almost conscious hypocrisy by the Nazis, echoed in Vichy France, and even by considerable bodies of opinion in England and America. They imply complete admission of human failure. "Man has acquired certain powers, and has not learned how best to use them. He is inherently stupid and wicked, and had best recognise the fact and not attempt tasks beyond his powers." Such reactionary cries have been uttered at every crisis in the past six thousand years. They recall the protest against the impiety of Prometheus, who took fire from heaven, or the ancient Chinese philosopher who declaimed against the wicked innovations of boats and wheelbarrows. However, it is as difficult to move back as it is dangerous to move forward. We shall certainly have to adopt social habits totally different from those suitable to separate villages of self-sufficing

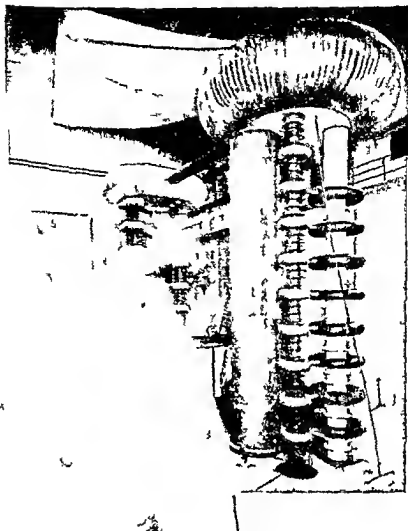
Mount Wilson observatory, built by 20th century magnates but directed by professional scientists



peasants. The fact that modern industry, both for technical and defence reasons, tends to spread itself over the countryside, does not lead to increasing simplification but rather to a greater emphasis on the need for efficient organisation and integrated planning.

Outside the simply reactionary camp there are still, however, fundamental differences of opinion, and these are almost sharper in science than in other fields of thought. The tradition of science *still carries marks of its social origin*. Modern science was created by the same movement that made capitalism. It is strongly attached to ideas of individual initiative and freedom of thought. However, the result of the combination of scientific technique and capitalist economy has been the creation of national and super-national monopolies, in the growth of which the old individualistic methods of industry have largely disappeared. Modern science, with its expensive equipment, its need for elaborate organisation and its close relation to industry, did not, indeed, even before the war, conform to the liberal idealist picture. Independent scientists had almost disappeared.

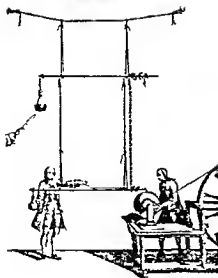
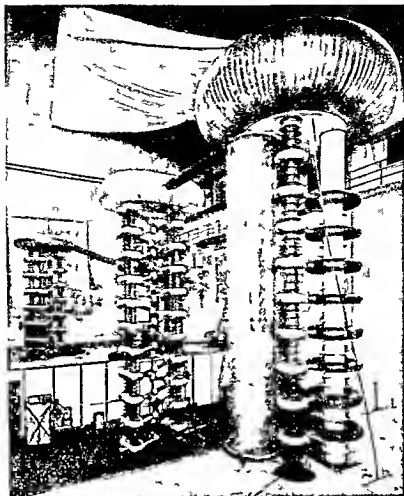
The war has already resulted in bringing science in every country in the world, America included, into the orbit of national defence on the basis of organised planning. Liberal scientists have a very natural fear that this will result in the destruction of the spirit that made science possible, and in the loss of the ideals of free enquiry and free application. Some are even willing to acquiesce in a situation in which science will be quite a minor and ill-rewarded human occupation, provided that it is left alone by the state and industry ; but this hope is as certain to be disappointed



as that of the more thorough-going admirers of the past. Science is too useful, indeed, essential, to the day-to-day running of modern industry to be allowed to sink into a safe obscurity. Science can only live when it is in the forefront of human activity. What is needed is a more thorough analysis of those characters in scientific work that make for initiative in discovery and theory, and for critical thoroughness in the establishment of facts. It has already been found in practice that it is possible to retain these characters, combined with quite extensive organisation, as long as the scientists are given responsibility and allowed to arrange their own work. What has been done, and is being done, for war, could be done equally well for peace. The world of science has fortunately always been free from many of the mercenary motives that hinder co-operation in other spheres of life. Democratic collaboration is the essence of the work of a laboratory or the study of a whole range of natural phenomena.

One implication is that science can no longer stop short at establishing facts. It must go on to see that its discoveries are adequately and rationally utilised. It was in the Soviet Union that this was first realised. There science has for many years taken a leading and recognised part in planning the utilisation of national resources to the best advantage. The assessment of human needs has led to the rational study of the best ways of meeting them, and given a broad direction to the progress of scientific research. Many scientists of the old school have feared that this would lead to the destruction of pure science in favour of applied. This has not proved to be the case. Pure science is probably being studied as intensely and over as wide a field in the Soviet Union as in any other country in the world, and certainly more so than in wartime England. In war, indeed, all countries are obliged to push forward with pure and applied science together, and the very critics of planned applied science are often in the forefront of this effort.

In practice, the intellectual and material concerns of the most active leading group in the community dominate the form and content of scientific thought of the time. The seventeenth century was the age of mercantile adventure, and sciences connected with navigation and gunnery held first place. At the end of the eighteenth century the rising manufacturers directed science towards chemistry and the study of heat. In the nineteenth century, the lead passed over to electricity. In every case, science



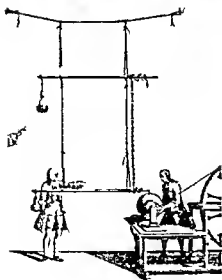
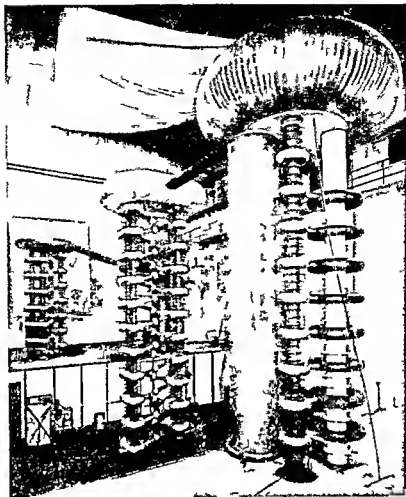
In 1746 Musschenbroek said of this first successful storage of static electricity "I wish to report a new but terrible experiment which I advise you on no account to attempt yourself"

Today this two million volt high tension generator, involving essentially the same principles is used for nuclear research at the Cavendish Laboratory, Cambridge (above)

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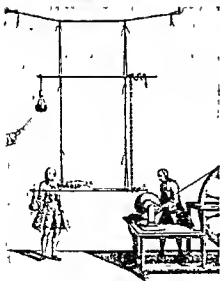
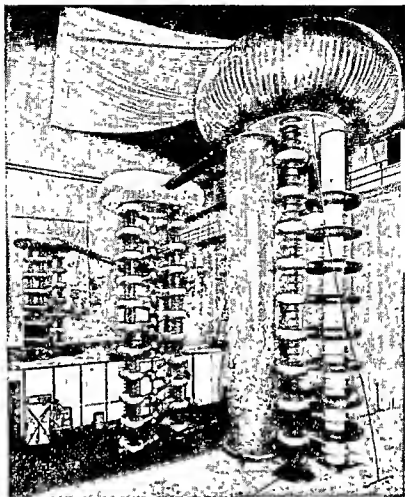
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served the interests of a limited group, and its benefits to the rest of the community were incidental. The essential difference between the present and the past is that we now have the possibility, and indeed the necessity, of organising consciously what had before merely occurred from the unconscious play of social forces.

- To organise consciously the machinery of civilisation naturally puts a much greater responsibility on human beings than they have had in the past. As long as no one is capable of tracing out the general effects of human actions the most terrible consequences can occur, and no one will be to blame. Indeed, the classical economists had always been able to demonstrate that crises were quite accidental by products of a fundamentally sound economic system. But once man consciously takes charge of the general organisation of production and distribution, the governing powers can rightly be held responsible for any failure. But we are still far from an ordered economic system, planned for the general good, and a long struggle lies between us and its achievement. Nor can the benefits that an ordered society will bring be achieved all at once. The task is one enormously greater than any man has before attempted. That any solution is possible is due only to the development of scientific technique and scientific methods. The technical possibility of human organisation on a world scale is already there. We know how to make the goods, how to distribute them, and how to ensure the necessary communications. Even more valuable is the knowledge science has brought as to how to study and measure such a vast and complex thing as the changing needs of a human society.

The consciousness of the unity of mankind as an effective working community can only be realised by the use of science. The danger inherent in the present situation is lest an attempt should be made merely to utilise science in a limited way to serve special ends. This process may at first be extremely effective, as Hitler has shown in the building up of the terrific striking power of the new Germany. To Hitler the scientist is an intellectual fool, who can produce useful results under orders. This attitude is not limited to Fascist countries. The effective rulers of all capitalist countries have treated science as a useful and docile slave, and many leading scientists are only too ready to accept this role. But science used in this way can only result in increasing the misery and difficulties through which civilisation is passing.

Knowledge is not something to be harnessed like inanimate power. If it is, the stupidity of the ends outweighs the technical excellence of the means. Already far the greater potential productivity of science goes into war, and war everywhere is the force directing the trend of scientific advance. To reap the full benefits of science, there must and can be an intimate relation between science and social processes at every stage—in assessing needs, in studying and modifying social forms, in production and distribution problems, and finally in keeping guard over the results of its application, to see that they do not turn in unforeseen and undesirable directions.

For that, the scientist must be in close, free and friendly relation with the democratically ordered state machinery, and the people at large must have an adequate understanding of the possibilities and limitations of science. At present, science is far too much regarded as a mysterious production of magical results. The object of any attempted popularisation of science should no longer be, as it rightly was in the nineteenth century, to acquaint the public with the mere facts of scientific discoveries. Far more important now is to relate those discoveries to their applications in ordinary life. This is a matter for education and publicity. Science has never taken the place it should in our educational scheme. It needs to be worked in at every stage and related throughout to the interests of each age of student. Far more can be done to popularise science. There is no part of science so obscure and mysterious that it does not have some bearing on current problems. The works of such writers as Haldane and Crowther have shown that it is possible to write of science in the new way with the same popular appeal as that of the great scientific publicists of the last century.

Any realistic picture must, however, point out not only the possibilities of science, but the factors preventing those possibilities from being realised. There is today a growing concern with a better world after the war. But to consider the shape of such a better world without considering the obstacles that lie in the path of its realisation is simply escapism. We can study those obstacles best, not projected in an imaginary form, but here and now.

Private and institutional greed, the desire to preserve orders and ranks in a society that has outgrown them, have been potent factors in the past, and are potent factors still, in delaying pro-

gress. Unless they are dealt with, and dealt with now, there is no chance for any better world.

That is the major practical problem of our time, and it is a social and political one. It will be solved by the people themselves. But the technical forms of the solution, and the rapidity with which it will be possible to achieve a better world, will demand science ; and for that reason alone, the people need to know and to understand, possibly better than the scientists themselves, what modern science is, and how it works.

JOSEPH NEEDHAM, F R S

MATTER, FORM, EVOLUTION AND US

Modern science looks at living matter and its origins and how we ourselves come into the picture



Sculpture :—The typical Greek art ; Orestes and Electra

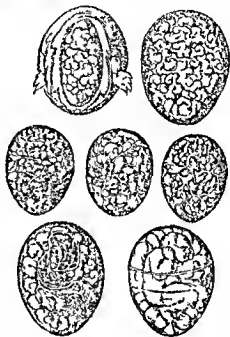
One of the least generally recognised revolutions in our thought is that which concerns Matter and Form, and hence everything to do with Life. As in many other things, ideas of Western civilised man derive here from the Greeks, especially Aristotle (fourth century B.C.), who tended to look at everything in terms of their greatest national art: Sculpture. From this point of view there was on the one hand *matter*: chaotic, homogeneous, the same all through, like marble or cheese; and on the other hand there was *form*: the form, for example, of a beautiful man

or woman, existing as it were beforehand in the mind of the sculptor, and to be impressed upon the brute matter by him with much toil and creative labour. Form was thus felt to be much more important than matter, and even all change was thought of as the taking away from matter of one set of forms and the imposition on it of another. True, forms did not seem to be capable of existing without matter, except, it was supposed, in the case of the Gods themselves.

The preoccupation of the Greeks with form was, of course, a very beneficial thing for biology. The Greek vase-painters were accustomed, from an early date, to drawing all sorts of fishes and



Baked clay plate showing four sea fish and two shells, made by a Greek craftsman in the 4th century B C.



The mediæval idea of how the human embryo is formed, illustrations from Jacob Rueff's midwives' book, of 1554

other beasts with exquisite accuracy. The great audacity of Aristotle lay in the belief that if one set about it the right way, the infinite muddle of animals and plants could be reduced to some sort of order. The first classifiers were indeed courageous men.

The old ideas of form and matter ruled human thought long after the Greeks had gone, and long after the end of the Roman Empire, right through the Middle Ages. They can still be found in our own thought, if we look carefully for them. They gave rise to such mediæval Church doctrines as that of transubstantiation. And they are exemplified in the ancient notion of

how the embryo is formed in animal development Aristotle thought that it was like a statue being made, the matter of it being represented by blood, and the shaping influence by the seed I looked through many a mediæval manuscript to find a picture of this, but eventually I found it in the *Woman's Book* of Jacob Rueff, written in 1554 The whole process is entirely imaginary, but it is amusing to see how starting from a system of blood-vessels radiating from the heart (like a chick embryo's circulation) he reaches an outline of the child, sitting like a cherub in clouds * It was our own English anatomist, the great William Harvey, who exploded these notions, by opening the wombs of animals killed in the chase, and finding nothing inside Nothing, that is, that he could see, for he had no microscope in 1640 to show him the minute egg, embedded in the wall of the womb, and destined to grow and differentiate into the future animal

What is wrong, then, with the old idea of matter? Why can we not think of the matter of which living things are composed—your arm, for instance, as you read this article—as simple, like marble or cheese? Because it is unbelievably complicated It is wheels within wheels, envelopes within envelopes, a fantastic box of tricks The living body is “composed of” myriads and myriads of ultimate particles, electrons, and protons, indeed, but they are *arranged* and *organised* in an order far exceeding that of the simple matter of a statue, or even of a complicated and beautiful crystal And the point is that there is nowhere you can put your finger on and say “Here Form ends and Matter begins”

This wants elaborating a little more At the upper coarser end are the forms we know so familiarly, the different shapes of animals and plants, and just below this level, the different shapes of the organs into which we may dissect them, using no more than the powers of the unaided human eye At the microscopic level we stand on the threshold of a new world—the first observers with microscopes, in the seventeenth century, certainly agreed with Sir Thomas Browne “We carry with us the wonders that we seek outside us, there is all Africa and her prodigies in us” The tissues and organs of the body are built of millions of living cells, cells, as we now know, with a considerable capacity for individual life separated from the whole Digging further down, we find that each cell is built up of smaller entities, the form of

which may be apparently unimportant (such as that of fat globules) or certainly very important (such as that of the chromosomes in the cell nucleus, which bear the keys of the inherited qualities)

And so at last we arrive at the molecular level. The level where we are face to face with the molecules themselves, built up of orderly patterns and arrangements of atoms, each atom a miniature solar system, with the protons and electrons circling like the heavenly bodies in their necessary orbits. This is an important transition, for several reasons.

In the first place only in comparatively recent years have we felt quite certain that the chemical molecules have shape. Up to about the end of the First World War it was open to some scientists to say, as they did, that our chemical 'formulae' or molecular plans, were true only in our own imagination, and corresponded to nothing in nature. But when the study of "monomolecular films" (i.e. films of substances so thin as to have only one layer of molecules) was pushed forward, by Hardy in England and Langmuir in America, it became certain that our formulae *do* represent reality. Long hydrocarbon chains really are long, on a water surface the chain of a fatty acid does really stick up while its acidic group is "dissolved" in the water below. Box-like molecules behave as such. And all this was greatly strengthened when other scientists applied X-rays to the problem (Laue, Ewald, the Braggs), and showed the actual existence of the patterns of atoms which had previously been deduced by purely chemical experiments.

Form, therefore, is still with us. At the level of the atom, it becomes indistinguishable from order, from whatever the forces are that hold the spinning groups of ultimate particles together in their apparent solidity. And now that we are at the atomic level, we find, too, that modern physics has recognised that these ultimate particles are primarily electrical charges, and that mass is therefore a manifestation of energy. Of course, matter remains just as hard and material as it was when Dr Johnson kicked a piece of it and remarked of Bishop Berkeley's views that "they admit of no refutation, but carry no conviction." But all the same, something *has* happened to matter. It was only separated from form in bygone days because it seemed so simple, now we realise—and this is a revolutionary change—that we cannot separate them. Form, or rather Organisation, as we might now

A single living cell in tissue culture, photographed by dark ground illumination; a mass of fat globules lies around the nucleus. The cell is slowly moving towards the top of the page



SURFACE OF A SOLUTION



LIQUID CRYSTALS



Rows and chains of fatty acid molecules at the surface of a solution. Right—Regular arrangements of molecules in liquid crystals. If disturbed they will form up again in much the same way as before

call it, is present everywhere, at all levels, wherever we look, and the only other fundamental idea that we need is that of Energy. We can stop speaking of Form and Matter altogether if we begin thinking of Organisation and Energy.

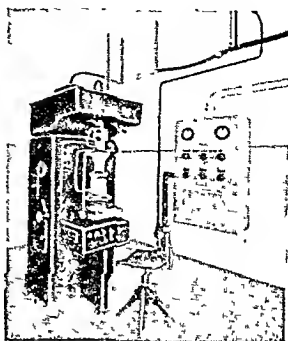
Another reason why the transition between the level of the largest molecules we know and the smallest living particles we know, is so important, is that they actually *overlap*. Here again is a revolutionary discovery of the past twenty years. The largest known molecules are those of the proteins, some of which are several million times as heavy as the hydrogen atom, our fundamental unit of molecule weights. The proteins are the most

important chemical structures out of which all living things are built up, they are essentially long chains or folded rings of carbon, nitrogen and oxygen atoms, like backbones, with side-chains of carbon, nitrogen and hydrogen like arms or ribs. Now during the last twenty years intensive study has been made of those infective agents responsible for many diseases of plants, animals and man, which are known as viruses. Tobacco plant rot, foot and mouth disease in cattle, and measles in ourselves, are all due to these living particles, small enough to pass through all filters, far smaller than the smallest bacteria which we can see through the microscope. But the interesting thing is that these "living" particles are so small that they are smaller than many of the larger "dead" particles or molecules of isolated protein. Their constitution must therefore be very much simpler than what we have been accustomed to imagine is required by living organisms.

At this wonderful borderline it is as difficult to distinguish Life from Death as Form from Matter. When do we say that a thing is alive? Presumably when it breathes, when it moves by itself, and above all, when it reproduces its like. The virus particles do not move by themselves, but then most plants and bacteria do not, whether the virus particles respire is also doubtful, but many seeds and germs respire very little. At any rate the viruses are extremely efficient at reproducing themselves. Inoculate a plant with a very small quantity of a plant virus, and before long you will be able to isolate large amounts of the virus, while in the meantime the plant has become diseased and perhaps wilted, probably because nutritive material which ought to have gone to build more plant, has gone into the virus instead.

Here, then, we have to deal with something living indeed, but so small that it is smaller than many chemical molecules. Between the living and the dead there is no sharp borderline. Until recently particles of viruses were so small as to be far beyond the reach of our vision, even with the microscope or the ultramicroscope, but quite recently a new device, based on new principles and called the electron microscope, has been brought into use, and by its aid it has been possible to take photographs of molecular particles and of the viruses themselves. The one on page 34 is well worth looking at. The particles seem to be rod-shaped. By making them "transparent" with X-rays their regular internal structure is being elucidated.

The electron microscope of
Ruska & Borries, in use today



Here there comes another surprise. If you talk to a biochemist about rod-shaped particles, he will be on the look-out for some odd goings-on. While particles like little balls clump together to form ordinary crystals, rod-shaped particles have a habit of clumping together to form "liquid crystals". At first sight, a liquid crystal is a contradiction in terms, for the sort of crystals that most people know about are those of sugar or washing-soda, semi-transparent, and solid, as hard as anything could be. But there are many chemical substances known which form regular arrangements not rigid in all three dimensions but rigid only in one or in two, the particles being arranged in various combinations of randomness and order. They may, for instance, slip over one another if squeezed; or their orientation may be upset by the passage of some foreign body between them, yet after it has gone through they form up behind it again like a squad of soldiers reforming after letting a lorry through their ranks. Sometimes a crystal, instead of melting directly to give a true liquid, when heated, will pass through a whole succession of intermediate forms, getting less and less strictly oriented as the temperature increases, until at last a true liquid is reached, where the molecules are all flying about at random like the crowd at Paddington Station when you look down on it from an office window high up near the roof. To continue the analogy, the crowd is rather



Particles of tobacco mosaic-disease virus photographed by the electron microscope



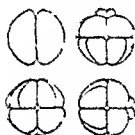
Liquid crystalline lecithin a fatty material present in all living cells



A goldfish swimming in a dilute solution of tobacco mosaic-disease virus, where the liquid is undisturbed no light comes through the polarising microscope but in the wake of the goldfish the solution is brilliantly illuminated

like a liquid crystal in that it is free to move up and down along the platforms, but only within those limits, so that it has a certain structure. To imitate the true rigid crystal, it would have to stop dead, each person at a definite distance from the nearest other persons. The viruses seem to be particularly prone to form liquid crystals. Looked at through certain optical apparatus, liquid crystals, when made to flow, show a bright flash of light. Some biochemists working on plant viruses made the amusing experiment of putting a goldfish in a virus solution, and letting it swim about under this apparatus. Wherever it went its tail was followed by the bright flashes of light caused by the liquid crystalline virus being temporarily disarranged. Some viruses may also form true solid crystals.

What holds good for the viruses also holds good for many of the proteins and other substances which form the chemical basis



Persistence of the primary axis in sea urchin eggs in spite of the rearrangement of visible substances in the eggs by centrifuging. To understand this picture one must read the paragraph in the text below.

of animals and plants. We know that these fibre molecules and liquid crystal states occur in the living cells of the body, and a great deal of work is now being directed to analysing them. They help us to understand a little of the extraordinary qualities of symmetry and polarity which animal and plant forms possess. How, for instance, does an egg know which of its ends is which, which end is to be the front of the future animal and which end the back? If a transparent egg of a sea-urchin, for example, is centrifuged, i.e. subjected to a very strong force like that which carries a tin can round at the end of a string when a boy swings it, the contents of the egg are largely stratified, different sorts of fat, granules, etc., coming together in layers. Yet the further development is not in the least affected. The egg will shortly afterwards bud forth its new small cells in exactly the same place as it would if nothing had been done to it. It "knows" which end is which, and your throwing things about inside it has not in the least confused it. It looks as if it had a "crystal lattice" inside it, like one of those rigid cat's-cradles of coloured balls

which you can see in the South Kensington museums. But it is obviously not crystalline in the ordinary sense because you can squash it like pulp. Knowledge of liquid crystals is therefore what we need more than anything else to enable us to understand the extremely subtle forms of rigidity possessed by animal and plant organisms.

The fact that fibre-molecules build up living structures explains a good many of the properties we associate with them in ordinary handling. The fibrousness of hair and the stringiness of muscle (meat) for example. Such fibres contract and expand. The shrinking of a pair of flannel trousers is closely connected with the contraction of a muscle. But whereas trousers and india rubber bands have an inert springiness, the muscle has what we might call an 'ert' springiness—it is the basis of all animal movement.

One thing more. A great discovery of the last thirty years has been that there is not just one standard sort of carbon atom, but several standard sorts, all recognisably carbon, but different slightly in weight. The same is true of many other elements, such as nitrogen and hydrogen. Quite apart from the great importance of this knowledge for physics, it has enabled biologists to use these elements as "tracers" since such atoms are, as it were, labelled, and can be followed around in the body once they have been introduced into it. In this way it has been found that a labelled atom of phosphorus or nitrogen, for instance, only a few minutes after entering the body, will enter into the structure of some of the protein of the brain or muscles, which, one would have thought, was absolutely fixed, supporting the living organism in an architectural way or playing its part in the great telephone exchange of the nervous system. Now this rapid interchange does not take place between the labelled atoms and "dead" protein isolated from the living body. It must therefore mean that in the living body, atoms are constantly "stepping out to lunch", as it were, from the molecules of which they are a part, while others step in to hold the fort. In this ceaseless interchange the pattern of the body is fully maintained. Such a co-operation, even though far down at the molecular level, cannot but remind us of the voluntary co-operation of individual human beings in maintaining patterns of society at levels of organisation far higher.

This thought brings me to some general conclusions. That the old distinction between Form and Matter has gone for ever, and

that the new collaboration of Organisation and Energy has come, is indeed a revolution. But there is more to say than this.

In analysing the living body, we came up from the ultimate particles, the protons and electrons, to atoms, from atoms to molecules, from molecules to the tiniest living particles, from these to cell-constituents, from cell constituents to cells, from cells to organs, from organs to whole animals or to the whole human body. But why stop there? Still further up there are the conjoint realms of human mind, and of human society, with all its complex associations, reaching up from the family to the whole unity of mankind. So we recount our levels of organisation. Each is larger than the one before, but also essentially more complex and more highly organised. In terms of space, each contains the smaller ones within itself.

But space cannot stand without time. In every individual development, that of man no less than the meanest of them, the new individual starts at a low level, and climbs up to its perfection. But also we know without shadow of doubt that there has been, roughly speaking, in time, a development of stages of complexity and organisation similar to those stages which we see as we reflect on the make-up of the highest organisms. There was inorganic matter before there were worlds. There were worlds before there was life. There was some sort of primitive life (perhaps not unrelated to the viruses we are now studying) before there were plants, and there were plants before there were animals. There were animals before there were men, and there were men before there were those social organisms which we know as families and tribes. Then there came barbarous nations and more civilised city states, and finally the national states that we know today.

It is often said that the second law of thermodynamics indicates an increase of randomness and a decrease of order in the non-living world as time goes on. On this one may remark that probably the physicists' definition of order does not apply to biological organisation or else that the biological rise of organisation is a process that has to be fully compensated for elsewhere in the universe (*see note on next page*).

After reflecting on this almost incredible rise in level of living organisation through millions of years, could anyone be so blind, so provincial, so audaciously foolish, as to imagine that the present condition of human society is the crown of the ages, the last and

finest perfection of which Nature is capable? Admirers of past ages, refugees from our time who like to bury themselves in the classics or the eighteenth century, sometimes talk as if they did. Humanity, they will tell you, has decayed rather than progressed, since Plato. Considered in terms of evolutionary time, Plato is almost a contemporary of ours. The wonder is rather that civilised man has been able to accomplish so much since the days of the sages of Greece, China, Egypt and India. And so in considering where lies the true line of advance in our own days, we have only to look for whatever forces there may be which are making for greater and better organisation, not a mechanical organisation as such, which Nature never deals in, though Fascists may, but organisation built upon and growing out of the full nature of human beings at their best. Hence the world co-operative commonwealth is not, as so many people seem to think, a wild preposterous optimistic dream, it is a certain resolution of our difficulties, having the full authority of evolution behind it. This is the faith, if faith it can be called, by which socialists should be sustained. Whatever defeats the cause of human unity may in our time receive, the socialist grounded in these facts will always be able to say, with Galileo before the Inquisition, "It does move, all the same." Whatever force hinders the coming of the world co-operative commonwealth, where all human races will live in harmony together, and where the old maxim will be true "from each according to his capacities, to each according to his needs", that force is ultimately doomed. Against the world process no force can in the end succeed. The tasks of Energy and Organisation in the making of our universe are still far from ended.

Editor's note (see p. 37). Joseph Needham wrote a chapter on this interesting subject in his book 'Time the refreshing river', and C. H. Waddington commented, 'While the theory of evolution states that the degree of organisation of living things is continually increasing, thermodynamics seems to mean that the orderliness of the world as a whole is continually decreasing. This paradox has been haunting the background of modern science for most of this century.'

Needham argues that it is not really a paradox at all since when a physicist says that the world is gradually running down by becoming more 'disorderly', he isn't really speaking of the same kind of order which the theory of evolution claims to be continually increasing. The 'disorder' of thermodynamics is according to Needham simply 'mixed upness', and there is no reason why it shouldn't be 'patterned mixed upness'. If we analysed a tune, and played all the A's then all the A sharps, the B's, C's and so on that would be an extremely orderly arrangement of the notes from the physicist's point of view, whereas when we played the notes as composed into the tune they, to him would be much more 'mixed up'. From the biologist's standpoint, it is the tune which is an organised arrangement of the notes, i.e. they are both more mixed up (as the physicist says rightly) and at the same time more organised. An increase in biological organisation is therefore not incompatible with a decrease in thermodynamic orderliness."

C H WADDINGTON, Sc D

LIFE FROM A NEW ANGLE

We don't seem to have made a great success of life recently. Is this because we think about it in the wrong way? Are our "commonsense" ideas about ourselves and the world adequate?

Try asking a friend to describe in detail the character of somebody you both know intimately. It is ten to one that, after thinking a minute or two, he will say, "Well, he's a queer chap, really." Actually he is probably no queerer than anyone else. "*All the world's a little queer save thee and me, and even thee's a little queer,*" as the old Quaker said. Even after thousands of years of dealing with his friends and neighbours, man has still not developed any satisfactory commonsense picture of what human characters are like. As soon as one starts thinking about a person, he begins to appear as a mysterious mixture of contradictory elements, which are, surprisingly enough, fused together in some incomprehensible way into a recognisable and definite character.

Scientific study has recently discovered a great deal about human beings, so that we can now form a much better idea of what they are really like. But to do so involves a certain effort of imagination. We can show, I think, that the difficulty of making an adequate mental picture of a human being was largely due to the fact that we tried to think in the wrong terms, we carried over habits of thought which are good enough in dealing with things like sticks and stones into fields where they are not suitable. In their efforts to go deeper into things, scientists, as Bernal said in Chapter 2, "have been forced to adopt new mental attitudes which involve a break with the traditions of thought reaching as far back as the Greeks, if not farther."

The new knowledge about man comes from many different sources. Herbert Read, in his introductory chapter, pointed out

that the great new developments in human thought are not confined to single subjects, but spread over science, art, politics, philosophy, in fact over all the interests of thinking and feeling man. Even within science, many branches have contributed to the new advances. They come from sociology, which is the study of human societies, as well as from psychology, the study of man's mind, and biology, the study of animals, including man. In this chapter I shall take the last of these as my point of departure, leaving the others to be dealt with in detail by other writers in later chapters. And this will be taking things in the right order, since the general characteristics which man shares with other animals are more fundamental than the specialised sociological and psychological traits which he only acquired at a late stage in his evolutionary history.

Within the last hundred years, scientific ideas about animals have undergone three revolutions. The first happened in the middle of the last century, and its decisive point was the establishment by Darwin of the theory of evolution. By today this has just about worked through into commonsense. Darwin's contemporaries rejected with horror and disgust the unbiblical idea that human beings are descended from some being much more like an ape than any existing man, but people nowadays have learnt to accept that as a matter of course, and to find in it, not a degrading insult, but a reason for hope that we may become still better in the future.

The other two revolutions are more recent, and have not yet had time to become respectable good sense, they still seem pretty odd. One is concerned with the ultimate units which determine the nature of an animal, whether it is a man, a cat or a mouse. The fundamental discovery on which it is based became generally accepted among scientists only about forty years ago. The other twentieth century revolution deals with the way in which these units work together during the development of the animal, its main discoveries were made only about twenty years ago and are still being worked out.

The first of these two great new discoveries came out of the study of heredity. Everybody knows that children sometimes, and in some ways, resemble their parents. It seems at first sight a rather trivial fact. And it is undoubtedly tricky, as you can learn from anyone who tries to beat the book by studying the pedigrees of race horses. But its importance in biology is this. The simplest form in which an animal ever exists is as the tiny fertilised egg at

the very beginning of its individual existence ; all through its later life it will be gradually getting more and more complicated. If one wishes to know what are the basic qualities of an animal, the place to look is therefore in the fertilised egg. And anything which is in the egg must have got there by inheritance from the parents, whereas other characteristics which appear later in life may have been produced by outside influences during the course of the animal's existence.

The commonsense view of heredity is still, I suppose, what it used to be fifty years ago, namely that a child is some sort of mixture of its parents, a kind of blend between them. Darwin already realised that there must be something wrong with this. If it were true, people would gradually get more and more alike as generation succeeds generation. You can easily see why if you mix together all the brightest paints you can find ; at every mixing the result is more drab and mud-coloured than the ones you started with. Darwin knew that as evolution has gone on animals have, contrariwise, become more and more different from each other. But although he knew there must be something wrong with the ordinary view, he did not discover the true state of affairs.

That was done by the Czech monk Mendel. He seems to have first spotted the answer by pure intuition. He saw that there must be separate hereditary factors corresponding to the various characteristics which an animal may inherit, and he worked out the rather complicated way in which these must (if the whole system is to work) be handed on from parent to child. Having guessed all this, he set about demonstrating it ; and triumphantly did so with the pea-plants in the monastery garden. It is one of the most splendid examples of a hunch which came off.

The exact rules of heredity are not altogether simple, but there is no need to explain them here. They are pretty well-summed up in the old jingle :

There was a young fellow called Starkie,

Who had an affair with a darkie.

The result of his sins

Was quadruplets, not twins,

One black and one white and two khaki.

But they should have been his grandchildren, not his actual children. Anyone who wishes to understand the reality behind this piece of nonsense, should read *You and Heredity* by Amram Scheinfeld.

The point I want to make here is that Mendel showed that the

essential nature of an animal is determined by a number of separate individual hereditary factors, rather as physicists have shown that an apparently continuous substance is really composed of separate atoms. An animal is not a mixture in which the different constituents blend together, like paints, but one in which they retain their individual characters, like the flavours in a cocktail.

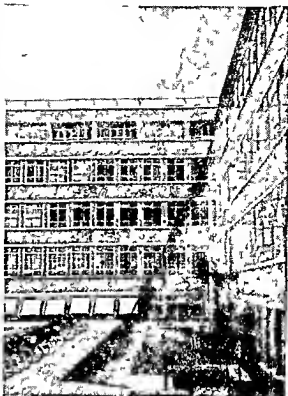
This is a point which commonsense has never fully grasped, although it sometimes seems to be toying with similar ideas. For instance, we say that a child has inherited its father's nose but its mother's mouth. And according to Mendel that may be roughly correct. But we are still surprised at the unexpected combinations of traits in our friends' characters, though now the biological theory shows why we should expect to find them. Hitler, for one, has never understood that a man may have a Jewish nose but a Christian, or even a Nazi or any other kind of character. A scientific plant-breeder nowadays thinks of a particular variety of wheat, for instance, as having a set of separate characteristics, such as earliness, hardness of grain, etc., and it is his business to fish out the characteristics he wants and combine them in his new variety. That is the kind of basis on which we have to build up our idea of human character.

The hereditary factors themselves have turned out to be much more ordinary, commonsensical things than was at first thought. They were originally discovered by counting the different sorts of offspring from hybrid peas and mice and so on, a strictly correct point of view considered them as purely hypothetical entities, mere symbols which entered into the calculations. But Morgan in America took the plain man attitude that each factor must be a definite little particle of matter, and set about finding them. Find them he did, and thereby earned a Nobel Prize. They lie in rows along the thread-like structures known as chromosomes, which can be found in the middle of every cell in the body. With the aid of the best microscopes, we can almost see these particles in a few special cases, there are some cells in which the chromosomes are very large and have a banded structure, and we can show that each band either is a factor, or at any rate encloses one.

From all this it appears that the fundamental nature of an animal is embodied in a collection of little lumps of material, like a set of bricks. But it is impossible really to make much sense out of such a theory unless we also take into account the second of the recent biological revolutions. For our friends certainly are not just

bundles of quite separate and disconnected traits. Each individual has a certain unity; the different facets of his personality hang together in some way.

It is from the study of development that we have obtained our deepest insight into the unity or "wholeness" of living things. The gradual growth of the fertilised egg into the adult animal, accompanied as it is by the formation of more and more complex organs and tissues, has always appeared to philosophers, from Aristotle onwards, as one of the



The Zoological Laboratory, Cambridge

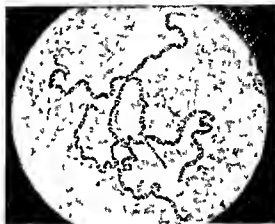
most mysterious happenings in Nature. It has also been extremely difficult to find any way of explaining it. When the first partially successful attempt was made to unravel the processes involved, in the 1890's, it immediately appeared that the eggs of many animals do not behave as though the animal was no more than a collection of separate factors. On the contrary, they acted as though they were set to develop into a whole unified animal. For instance, if a piece were cut out, or even if the whole egg were cut in two at a very early stage, the parts might still form normal and complete individuals instead of just bits and pieces.

Thus at the beginning of the century biology was confronted with a paradox. On the one hand, the essential nature of an animal, as revealed by its heredity, was made up of a set of separate particles, and on the other hand it might behave in its development as though the important and determining thing were its unity and "wholeness".

Neither of these points of view sounds good ordinary commonsense.



Magnifying about a thousand times, here is a gland from the inside of a fruit fly maggot. It is made up of cells, each cell being a lump of jelly with a nucleus at the centre. There are a few of these cells, teased out of another gland, at the top of the picture.

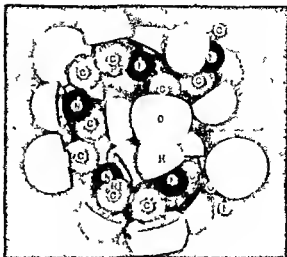


Magnifying one hundred times more, we reach about the limit that the microscope can manage. This is the inside of a cell nucleus, squashed out flat. It contains thread-like chromosomes which are striped with dark bands. Associated with each band is an hereditary factor; but whether the factor is the whole band or only part of it we do not know.

I have already pointed out that the "particle" view is really rather odd if one tries to apply it to normal life. And the idea that the essential thing about an animal is its unity is so queer that some biologists felt that it could not be explained in material terms at all, and were led to imagine the wholeness as some sort of mystical developmental soul. The matter could not be left there, with biology falling between two stools neither of which looked at all comfortable to sit on. But it was a good twenty years before any hint of a solution began to come along.

It was in 1918 that Spemann, a German scientist, discovered that in the newt's egg at a very early stage there is one part which controls the development of all the rest. It is known as the "primary organiser". The best way to allow it to show off its paces is to cut it out of one egg and graft it into a second, placing it in a region which would normally develop into the flanks or belly. This second egg has now two organisers, its own and the grafted one; each of these organisers begins to develop into the central primitive backbone (notochord) of the young newt; and the important

If we could magnify about another hundred thousand times, we imagine we would see something like this (The picture is really a model of a few of the chemical atoms making up the contractile substance of muscle, the chromosome substance is thought to be similar) From Astbury



and surprising thing is that they cause the cells surrounding them to develop into the remainder of the animal's body, so that the egg with the two organisers produces two complete embryos, joined together, of course, like artificial Siamese (or should it be Thailandic?) twins.

Spemann's discovery does not apply only to newts. It is much more important than that. The discovery was first made in newts because their eggs are laid in water and are easy to get at. In other animals it is more difficult to do the necessary grafting experiments. However, ways have recently been found of keeping the very earliest stages of chicken and rabbit embryos in artificial cultures long enough to do the experiments, and I have been able to show that they also possess organisers. Luther in Germany and Oppenheimer in America did the same for fish. No one has done any work on reptiles, because their eggs are technically too difficult to handle, but there is little doubt that Spemannian organisers are responsible for the development of all backboneed animals, including man.

The living organiser, that is to say the little lump of cells which we can cut out of an egg and graft somewhere else, has a strong tendency to produce a whole animal; even quite a small piece of it can reconstitute itself so that a whole newt is formed. As soon as it was discovered that the wholeness of an embryo depended on the properties of the organiser it was possible to do experiments (of cutting and grafting, etc.) to analyse how it worked. It immediately appeared that the production of a normal animal is not something which must happen completely or not at all. By the right manipulations, all kinds of partial or slightly abnormal animals can be

produced. The wholeness of an animal is, in fact, the result of a balance between a number of different processes, which can be influenced separately.

For instance, the first part of the body which is formed under the influence of the organiser is the central nervous system, i.e. the brain and spinal column. But a complete and well formed brain is not produced in a single process, like a rabbit out of a hat or a crystal out of a solution. It involves a number of different processes, and the organiser has to strike the correct balance between them. One of the processes, for instance, involves a substance known as the "evocator" which passes from the organiser into the surrounding cells and causes them to develop into nerve cells. If the evocator acts alone, the resulting mass of nerve cells is quite formless. In order that a normal brain shall be formed, the mass has to be moulded into the right shape by several other processes, it becomes thicker in the neighbourhood of muscle, and thinner over the primitive backbone (notochord) and so on. These processes modify one another and interlock in such a way that a normal shape is produced.

Incidentally, we still do not know the exact chemical nature of the evocator substance, but we know several other chemical compounds which can act like it. They are fantastically effective. The fact that you have a brain at all—and I hope it is standing up to this rather technical discussion—is due to the stimulus of about 3 billionths of an ounce of evocator (too little to cover the point of a pin) given off from your organiser when you were about minus $8\frac{1}{2}$ months old.

You will notice that in the last paragraph but one above we have got back again to a viewpoint from which the animal appears as a set of separate things. But now these things are not static particles but dynamic processes, processes of making tissues develop, of thickening or thinning them and so on. The paradox by which an animal is both a collection of distinct particles and yet is one single unity disappears if the hereditary particles are each responsible for starting some developmental process which can interact and interlock with other processes. The same trend of thought, by which we have solved this difficulty, is characteristic not only of modern biology, recent developments in physics have shown that the ultimate electrons and protons of which material things are made are best thought of not as solid particles but in terms of waves, that is to say, of processes of a particular rhythmic kind.

A newt's egg with an organiser graft, magnified about twenty times. The egg's own organiser is near the groove at the bottom right, the graft lies just above the deep groove in the centre



The result of an organiser graft. The main new embryo is on the right, with its head at the top and tail at the bottom. Attached to its belly is a Siamese twin embryo, pointing the other way. (After Holtfreter)

If we are going to use this solution of the paradox, we have really got to put processes first in our thinking about animals. Particles and substances are not the fundamental entities into which living things must be analysed : they are only important as parts of processes. It is much more difficult to think like this in actual fact than to say that we ought to do so. Most commonsense methods of picturing the world nowadays are based on the science of the seventeenth century. We "instinctively" think of solid lumps of stuff, and if they happen to be pushing one another around in some process, that may be interesting but is not essential. In twenty or fifty years' time, or however long it takes for today's science to become "commonsense", we shall "instinctively" think of something going on. If we find it convenient to analyse it into lumps of matter bumping one another, well and good, but we shall not be surprised if someone else prefers to think of it in some other way.

This type of thinking, in terms of processes, is derived from a consideration of the most fundamental and basic properties of living things. We shall therefore have to use it for the ordinary everyday affairs of life as well as for recondite and far away matters like the development of a newt's brain. We shall, for instance, realise that our friends are made up of a number of separate and perhaps conflicting traits. But we will not picture Smith's bad temper as a thing which he has, and which cannot fit into the same place as his kindness. We shall say that he often flies into a rage. This is not just an opposite to feeling kindness for some one. They are not two things—they are two processes, which can occur one after the other, or which can both go on together, modifying each other as they do.

Even when we are dealing with groups of people instead of single individuals, we shall probably find that the "process" view is the most enlightening. We may give up trying to analyse our society into institutions, like the Church, the City, Industry, Agriculture, etc., or even into bodies of men, like the Industrialists, the Financiers, the Working Class and so on. We are likely to think of it in terms of processes—of manufacturing, of selling, of influencing public opinion, etc., or of the Class War, or of all working together for the common good. There will still be many kinds of politics, but politics in terms of processes and not of things.

It is clear that this kind of thinking is different from our present commonsense. I expect that you will be able to find at least hints of the same kind of "process thinking" in the chapters of the other specialists who contribute to this book. Would E H Ramsden allow me to suggest, I wonder, that the shifting of interest among painters from the material object to the underlying form—for instance, the painting of the *wind* in the trees rather than the trees themselves (Chapter 16), or the creation of mobile sculpture by artists like Calder—is another part of the same trend as the scientist's movement away from analysing into things and towards analysing into processes? Whether that is a true parallel or not, at least it is certain that a new way of looking at all the phenomena of life is being produced by recent scientific advances, and will have to be incorporated into the general outlook of future generations. Working out its consequences will be a long task, which will require, not just a subtle new application of the old ways, but real imagination. It may be difficult, but it will certainly be interesting.

J G CROWTHER

HELTER SKELTER UNIVERSE

The latest views on the nature of the astronomical universe

Herbert Read said in the first chapter in this book that science has revealed a universe terrifying in its extent and majestic in its orderliness. That is the picture unveiled by the telescope and the calculus in the last three centuries. It made an almost inconceivable contrast with the limited universe of the pre Galilean era, when the stars, as Shakespeare said, were regarded as the ever fixed marks that look on tempests and are never shaken.

But just when we were getting used to this big idea, the science of the twentieth century has altered the theme again. We are now recognising a universe perplexing in its limitations and comic in its antics. It is a kind of infant prodigy, grotesquely developed beyond its years, for it seems to have the ridiculously small age of only 2,000,000,000 years. It is difficult to imagine how the universe has crowded all of its complicated evolutions within a span of life which, on the cosmical scale, is so short. We have learned very recently that whole galaxies of stars, like the Milky Way, which float in space separated by incredible distances from other similar galaxies, are shooting along at speeds of 60,000 miles a second. We ourselves speed around the axis of the earth at several hundred miles an hour, and with the earth reel round the sun at 18 miles a second. Together with the sun we shoot towards the constellation of Hercules at 12 miles a second. With the whole Milky Way we roll round like a speck of mud near the rim of a giant wheel, at a speed of hundreds of miles a second. Though the outer rim of the Milky Way spins at such a pace, it takes 300,000,000 years to complete one revolution, and has, indeed, probably only completed about six rolls since the beginning of the universe with which we are acquainted. What things were like

before then, scientists are only beginning to imagine. The ancestor of our present universe may have been a relatively small solid lump of matter *quite different in nature from the atoms of iron and oxygen and other elements with which we are acquainted*. It may have been billions of times as dense as lead, and millions of times as hot as the hottest star.

Indeed, it may have been a single super-atom, which was also super-radioactive. And the unfolding, evolving universe that we know may be merely the later results of the spontaneous explosion of this primeval super-atom about 2,000,000,000 years ago.

And how did this original atom come into existence? No doubt the pious and gifted Abbe Lemaitre, who has done so much to develop this particular theory of the expanding universe, has his own answer.

When you stand on the platform of a wayside station of a main line, and a non stop express runs through, the sounds of the engine's whistle come with very different impressions. As you look at the oncoming train, the sound of the whistle has an unusually shrill and spiteful note, increasing in intensity as the train comes nearer. But as the engine rushes past, you notice that its whistling note drops the shrillness, and falls suddenly to a hoarse tone.

If the engine is stationary, the air-waves will fall on the ear with the same frequency with which they are produced. But if the engine is approaching, so that the whistle is being carried towards the listener, each air-wave which reaches the ear will not have to travel quite so far as the one before. As the speed of sound is constant, the interval of reception between waves will be shorter, and the ear will receive more waves in a given time. This will be heard as a note of higher pitch. When the engine whistle recedes, the effect will be the contrary.

The degree of the change in pitch is directly related to the speed of the engine, the higher the speed the greater the change. In fact, if the pitch of the whistle when stationary is known, the speed at which the engine is travelling can be calculated from the pitch of the sound heard by the ear. *The beauty of this way of measuring the engine's speed is that no knowledge of the distance of the engine is necessary.*

A similar phenomenon is found with any other sort of wave-

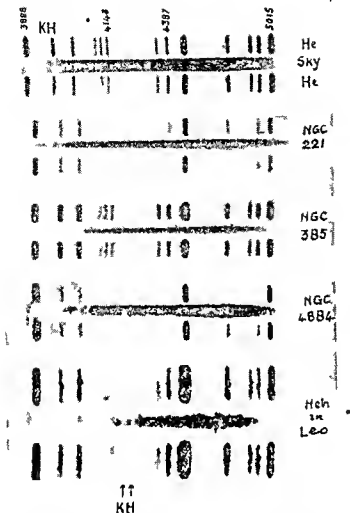
motion, such as light. Just as the *pitch* of the sound from the moving whistle depends on the frequency of the waves falling on the ear, so the *colour* of a moving light depends on the frequency of the waves falling on the eye.

The frequencies of the coloured rays of the spectrum increase from the red, through the orange, yellow, green and blue to the violet. Thus if the light is pure green when stationary, it will be slightly bluish when it approaches, and slightly yellowish when it recedes. The effect is, however, too slight to be noticeable in lamps moving on the earth because they are not travelling fast enough.

But it is different with the express trains of the universe. Many of them are travelling so fast that the colours of their rays are very distinctly and measurably changed. Consequently, their speed of motion away from, or towards ourselves can easily be calculated.

One of the most remarkable paradoxes of recent science is that while more and more objects are found to be super-speeding, speed itself is found to have a limit. Nothing can travel faster than 186,000 miles a second, the speed of light. Fizeau made an extraordinary experiment in which he showed that light passes through moving air with just the same velocity as through still air. It goes against the wind, or in still air, or with the wind at exactly the same speed. The same thing was found by Michelson and Morley, who showed that the speed with which a ray of light reached anywhere from a source on the earth was quite unaffected by the earth's own speed, whether towards or away from the object. Whatever you do, you cannot make the speed of light faster or slower than it is. It is, in fact, the speed limit of the universe.

This remained an unintelligible conundrum until Einstein showed that it could be explained if time and space are not regarded as independent of each other, but as different facets of a unified underlying world of space-time. Space and time were, in fact, revealed as, in a sense, different aspects of each other. And from this, other relations were discovered. It became clear that mass and energy, hitherto thought to be distinct, are also double-personalities, and can therefore be transformed into each other. This explained the origin of the enormous energy which keeps the sun and stars shining. It is matter being turned into light. Then it was discovered that the size and mass of an object depended on its speed. If it was travelling very fast, its weight increased and its size decreased. Gravitation was found to be a



SPECTRA WHICH REVEAL THE RECESSION OF THE ISLAND UN

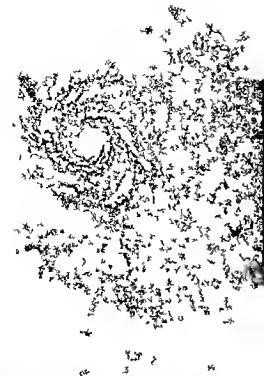
These are the five black horizontal smudges. The series of vertical lines on either side of them are merely spectral reference marks from which the position of the smudges can be measured. The top spectrum is of the sky which has no speed relative to the observer. The vertical lines at the left end of the smudge below the sky spectrum are of the nebula NGC 221 and H lines are slightly farther to the left or towards the blue when compared with the vertical reference lines. This shows that the nebula is receding from us at a rate of about 112 miles a second. In the third spectrum which is of the nebula NGC 385, the H lines are shifted to the right or towards the red by two faint blobs at the left end of the smudge. This shows that the nebula is receding from us at 3060 miles a second. In the fourth spectrum the K and H lines are slightly shifted to the right. The nebula NGC 4884 is receding at 4200 miles a second. In the fifth spectrum which is of the nebula in Leo, the H lines are shifted to the right. The amount shows that this nebula is receding from us at 4200 miles a second.

natural consequence of rotary motion and other factors, and it followed that light behaved as if big masses such as the sun could bend and hold it back. Another way of expressing the effect was that mass bent space, and made it curved. In fact, it seemed that space itself might be limited in extent. Such were the deductions that arose from the observed fact that the speed of light is constant.

But to return to the discovery of the actual speeds at which huge objects, such as stars, incomparably more ponderous than rays of light, are moving. The light of the lamps of the celestial expresses is provided by vibrating atoms. Like engine whistles, the frequency of their vibrations is exactly known. The helium atoms in the most distant stars are observed to vibrate at just the same rate as those on the sun or in the scientist's laboratory. Examination of the light from helium and other atoms will therefore reveal whether their bearers are moving towards or away from the earth, and at what speed. This can be done with the aid of the spectroscope.

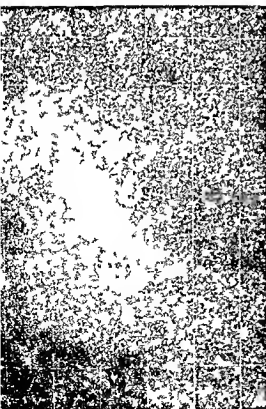
Possessing this most ingenious method of measuring the speed of celestial objects, no matter how near or far they may be, astronomers have compiled a kind of Bradshaw of the Universe. The to and fro speeds of several thousand individual stars have been measured. So far, the entries in the Bradshaw are not very startling. Many of the individual stars and planets seem to be travelling at about 10 to 20 miles per second, which is of the same order of speed as the earth round the sun.

Recently, however, the Colour Speedometer has been usefully applied to other heavenly objects, the nebulae. These are of two kinds. One consists of masses of luminous gas, while the other consists of independent clusters of millions of stars. All the known nebulae of the first kind are within the galaxy we call the Milky Way, while all those of the second sort are known to lie out in space, far beyond the frontiers of our own galaxy. Though few individual stars can be distinguished in those extra galactic nebulae, it is almost certain that they consist of millions of stars, because the light received from them is exactly like the mixed rays from a vast crowd of ordinary stars. The extra galactic nebulae are Milky Ways or galaxies on their own, containing tens of thousands of millions of stars. They are conveniently called Island Universes to describe their size and isolation, though, of course, they are vastly smaller than, being only parts of, the Universe as a whole. One of the nearest of them is the spiral



THE SPIRAL NEBULA IN CANES VENATICI

This is an Island Universe of stars right out in space far beyond the limits of the galaxy. The spectroscope shows that Island Universes like this are rotating like giant catherine wheels. The spiral arms consist of myriads of stars which have congealed from matter that has been expelled from the centre under the force of the swift rotation.



THE MAGELLANIC CLOUD

An instance of the profusion and striking beauty of the objects in the universe.

nebula in Andromeda But in spite of its mighty size and distance, it submits to the measurements of the Colour Speedometer It is known to be approaching us at a speed of 20 miles per second Nearly all other Island Universes, indeed all beyond a certain distance, are found to be receding from us But how do we discover their distance?

The distance travelled by your motor-car is measured by the number of revolutions of one of the wheels The circumference of the wheel is known, so the distance travelled must be the product of the length of the circumference by the number of revolutions The counting of the revolutions is done by a system of geared wheels which registers a familiar row of figures The cyclometer is a very old invention It was described by the Greek engineer Hero nearly two thousand years ago But the distance of Island Universes cannot be measured by ordinary cyclometers There is no straight and narrow path by which they may be rolled from the earth to the ends of space

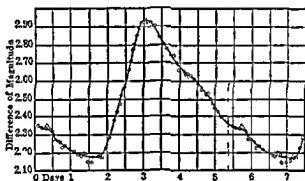
There are, however, other methods of measuring distances One is that used by surveyors, who measure angles at the end of a base line, and deduce thereby the distance of an object This method will not work with the Island Universes, because no base line long enough to give any result is available to human observers Even the diameter of the earth's orbit is negligible in comparison with their distances Once more the Celestial Lamps come to our aid The distance of a lamp can easily be calculated by comparing its apparent candle-power with its actual candle-power, for it is known that the strength of a light diminishes as the square of the distance

You will say "That is all very well, but are there any lamps of known candle-power in the Island Universes?"

The answer is "Yes" Nature has very happily provided us not only with lamps of known candle power, but with something like exceptionally powerful Stellar Lighthouses, which call attention to their presence by varying the power of their beams Many of the stars vary in their candle power in a very regular way In some cases this is due to regular eclipses by a revolving companion In others, it seems to be due to a rhythmical swelling or pulsation This latter kind of variation was first noticed in the star δ Cephei, so pulsating stars are named Cepheids It has been discovered fairly recently that the Pole Star is a Cepheid Its rhythm is almost exactly four days in length The change in

candle power is not very great, which explains why it remained undetected for so long. Stellar photography has found it out at last, and removed the aptness of the Shakespearean character's claim to be "constant as the northern star."

The Cepheid stars have a very extraordinary property which was discovered and applied by the American astronomers, Miss Henrietta Leavitt and Dr Harlow Shapley. They examined a group of Cepheid stars discovered in the Magellanic Cloud, a vast cluster of stars first noted by the great navigator. As they were in the same group, they were all at about the same distance, so the candle power, or more conveniently, the sun power, of these particular stars could be compared. This led to the discovery that their sun power had a perfectly definite relation to the period of the pulsa-



The curve shows the variation in the brightness of δ Cephei. It rises from minimum rather sharply to maximum and then falls less sharply to minimum, completing this cycle in a regular rhythm of about $5\frac{1}{2}$ days.

tions. If the star pulsated in ten days, it would be 950 times as bright as the sun, and if in 100 days, then it would be 20,000 times as bright. These stars not only betrayed their actual brightness, but also had the advantage of being very powerful lights, and therefore visible at exceptionally great distances. The distance of Cepheid Stars could now be determined by measuring their period, calculating from that their sun power, and comparing this with their apparent sun power. Consequently, the distance of any group of stars could be determined if a Cepheid could be found among them.

The Island Universes were first seen as hazy inconspicuous objects, the one which is largest to the naked eye, the Andromeda nebula, appearing as nothing more than a minor star. The introduction of powerful telescopes has revealed numbers of stars in them, and confirmed the surmise from the nature of their light, that they are

THE GREAT NEBULA IN ORION

*This is within our own galaxy It is
a huge mass of shining gas*

THE NEBULA IN ANDROMEDA

*The nearest of the Island Universes
It is only 680 000 light years away
and it is flying towards us at about
20 miles a second The light by which
we see the Andromeda nebula started
towards us at about the time when our
first sub-human ancestors appeared on
the earth*



vast systems of stars. The Andromeda nebula lies far beyond the frontiers of the Milky Way. As we can calculate its distance, its actual size can be deduced from its apparent size. It is of the same order as the Milky Way. Its actual brightness can in a similar way be deduced from its apparent brightness. It proves to be more than that of 1,000 million suns. Both in size and number of stars, it is comparable with the whole Milky Way. It is indeed a Milky Way of its own.

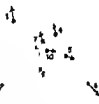
Telescopic research reveals vast numbers, in fact millions, of objects like the Andromeda nebula, though much smaller to the eye. They look smaller than the Andromeda merely because they are still more distant. Their distance can be roughly determined

MILNE'S THEORY OF THE RECEEDING STARS AND NEBULAE



*The Universe in Youth
The stars at random speeds
are clustered together*

In Middle Age The stars retain much the same speeds, but the faster-moving ones have travelled far from the centre of the cluster, and are now all receding, the most distant ones receding the fastest. The length and direction of the arrows represent the speed and direction in which the stars are moving



by comparing their apparent size with that of the Andromeda. Their actual size is probably much the same. In this way, Island Universes, as large as our own Milky Way, have been detected 500,000,000 light-years away. The light that we see them by started on its journey to us when life on the earth had not yet evolved beyond the stage of worms, and another 350,000,000 years had to pass before mammals had appeared.

There are even clusters of Island Universes in some parts of space. The movement of these Island Universes towards or away from us can be determined by the Colour Speedometer. It is found that all the Island Universes beyond a distance of about 1,000,000 light-

THE EXPANSION OF SPACE THEORY

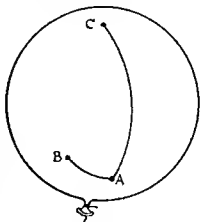
in which the Universe is compared to a balloon which is being inflated



The compact young universe

THE BLOATED MIDDLE AGED UNIVERSE

Stars which have the relative positions a, b and c at an early stage, have much the same relative positions A, B and C at a later stage. But c has receded much farther from a than b has from a, in order to get to C. Hence it must have travelled faster. In fact, its rate of recession is proportional to its distance



almost as fast as words are sputtered through the ether by man.

How is the flight of the Island Universes to be explained? The easiest explanation has been suggested by Milne. He has pointed out that receding distant Island Universes are only what one ought to expect from common sense. If a number of objects enclosed in a finite volume are moving with random speeds, some fast, some slow; then at a sufficiently later date, the fast-moving objects will obviously be farther away than the slow-moving ones, and will be receding. For if a fast-moving one was approaching you at the earlier date, it will soon have come up to you and swept past, swiftly moving out and receding on the other side. It is evident, too, that the objects will have travelled a distance in proportion to their speed, so when they are observed at the later date the distant ones are seen to be receding at a speed proportional to their distance.

Another explanation is that the whole universe is expanding like a vast balloon. The Island Universes start as dots close together on the surface. As the balloon expands, the distance between the dots increases. To a fly settled on one of the dots, the more distant would recede faster than the nearer ones, and the recession would be in proportion to their distance.

The fact of the expanding Universe raises the question as to whether space is expanding. If it is, what is it expanding into? The answer is that it is not expanding into anything. The notion of space is an intellectual construction from knowledge of real

objects. There is no reason why the notions of space derived from the study of the motions of Island Universes and atoms should fit into the notions of space derived by Euclid from the study of familiar objects and lines drawn on sanded floors in Alexandria. If questions concerning one are asked in terms of the other they will be meaningless.

Every age must conceive the Universe in its own way. Is it an accident that mankind should have discovered the commotion in the stellar Universe at the very time when its own affairs are in violent transformation? Does not occupation with revolutionary ideas in one direction predispose the mind to discover them in another?

Professor Bernal tells us in chapter 2 that the whole of human society is passing through enormously important transformations which are occurring far more rapidly than in the past. The pace has quickened. It seems that revolutionary ideas are stirring beneath our thoughts, and are being expressed variously but simultaneously through the imagination of astronomers, poets, physicists, painters and politicians, and will soon become the "common sense" of the man in the street.

J. G. CROWTHER

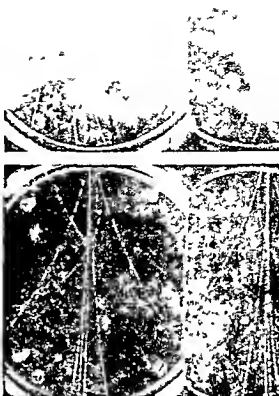
EXPLORING THE UNSEEABLE

The Quantum science of the Atom: The revolution in atomic physics—the study of the unimaginably small

E. H. Ramsden, in "Painting and Sculpture" (Chapter 16), explains how art has suddenly found itself presented with previously unimagined possibilities. This was due to its liberation from the dogma of representation. For several centuries artists had been preoccupied with copying Nature, with its content of men and things. Even Leonardo da Vinci defined the quality of a painting by the fidelity with which it imitated Nature. It is scarcely necessary to mention that several types of modern art do not copy anything in Nature, though sometimes we find Nature subsequently copying modern art. This has happened in Surrealism. Many must have noticed how bombed houses of today resemble Surrealist pictures of twenty years ago. Nature seems to have reversed the situation, and to be going in for a bit of representation instead of being represented, taking the compositions of the Surrealists as its subject. This connection between bombed landscapes and Surrealism is not fortuitous. Both of them arise from violence and conflict: the former from that of explosives, the latter from that of the emotions. These in turn both arise from underlying social and other conflicts. Physical science has also recently escaped from representationalism. That is really what all the revolution in physics is about. Since the foundation of modern science at the beginning of the seventeenth century, physicists had proceeded on the basis of the dogma that all matter behaves like that with which we are immediately familiar. Enormous objects such as stars were assumed to behave like big lumps of flaming coal, and tiny invisible objects such as atoms were assumed to behave like billiard balls.

The characteristic of the behaviour of all common objects is lack of surprise. They are characterised by continuity. Even when

Waves being transformed into particles. Here cosmic ray energy in the form of waves is being transformed into pairs of particles. The tracks bent towards the right are of positive electrons and those to the left, of negative electrons. The cosmic ray enters from above the chamber, hits a nucleus of an atom and pairs of electrons result, which create the tracks shown. The apparatus in which these photos were taken was built by Carl D. Anderson.



the merest hints, and they often unconsciously formulate their ideas so as to avoid difficulties as yet unforeseen. The average person needs pretty concrete demonstrations before a new idea becomes real to him.

The first cracks in the classical building of modern science, which was based on the idea that the worlds of the big and the little were merely different in size and not in quality from the world of the familiar, occurred at the end of the nineteenth century. Michelson and Morley, and Fizeau, proved that the speed of light is constant, and is not affected by the movement of its source. No material object has a speed greater than light. Hence no kind of signal can proceed faster than light. This has very far-reaching consequences, because scientific observation is based on signals. It had been assumed that the signals necessary for observation could, in principle, proceed at infinite speed. When it was discovered that such signals are impossible, physicists had to eliminate the assumption from the logical statement of the laws of motion. It demanded an enormous effort of abstract thought, and was first accomplished by Einstein in his theory of relativity. Experiment shows that the length and mass and time of a moving

object vary according to the speed of motion relative to the observer. It is evident that the concepts of space, time and motion used in the theory of relativity are not quite the same as those used in the language of daily life and derived from common experience of matter. They are no longer strictly representational. While physicists wrestled with the logical implications of the impossibility of making instantaneous signals, or observations, a new set of even more far reaching cracks grew in the monument of classical science.

The warmth you feel from a radiator falls on you in the form of waves which are of varying length. The heat is distributed among the carrier waves in proportions depending on their wave length, and the temperature of the radiator. Careful experiments have revealed the rules of distribution, and physicists have naturally tried to explain what they have observed. Planck showed that unless you assume that heat is emitted in packets of definite size, you cannot explain the observed distribution, but if you do, you can explain it perfectly. Planck said that heat, or energy, can exist only in packets of definite size. There is no such thing as an indefinitely small quantity of energy. The implications of this fact are far more bizarre even than relativity. For instance, a rotating wheel cannot change its speed gradually. It jumps from one speed to another. You do not notice the jumps with bicycle wheels, because they are very small compared with the wheel. But in atomic wheels the jumps are of comparable size, and produce effects unparalleled in ordinary experience. Planck's discovery that energy could exist only in finite quantities, or quanta, became the basis of the Quantum Theory. It follows from the theory that any change in energy, and hence any action, can occur only in finite amounts.

The theory was soon used to explain other strange discoveries. When a beam of ultra violet light is directed on to a zinc plate, electrons jump out of the zinc. Lenard discovered the very surprising fact that the speed at which the electrons jump off has nothing to do with the intensity of the light. If you turn up the ultra violet lamp so that the beam is more intense the electrons do not jump any faster, but there are more of them. This is quite different from the behaviour of ordinary waves, for instance, sea waves. The more intense or violent they are, the farther they throw pebbles up the beach.

Sir William Bragg has described the paradox very simply. "It

X RAYS BEHAVING LIKE PARTICLES

A very narrow invisible beam of X rays enters horizontally at the point indicated by the arrow. The beam has bumped four electrons out of atoms lying in its track. The four irregular lines consist of fine drops of water which have condensed on atoms agitated by the electrons that have been knocked flying. (C. T. R. Wilson)

is as if one dropped a plank into the sea from a height of 100 feet, and found that the spreading ripple was able, after travelling 1,000 miles and becoming infinitesimal in comparison with the original amount, to act upon a wooden ship in such a way that a plank of that ship flew out of its place to a height of 100 feet." Einstein was the first to explain the zinc electrons' standard jump. He made the revolutionary suggestion that the rays of ultra-violet light were really *particles*, and not waves. These light particles had a definite packet of energy. When they fell on the zinc plate, they ejected electrons that they happened to strike. And as all of the light-particles had the same energy, they communicated the same speed to all of the ejected electrons.

It will be noticed that the quantum theory introduces an enormous standardisation into phenomena. Instead of having electrons of an infinite variety of speeds jumping out of the zinc, they are all of one speed. It seems that Nature has not gone in for an infinite variety of individual goods, but a vast standardised mass-production along a strictly limited number of lines. Is it an accident that scientists have discovered the quantum theory of matter in an age when industrialists are elaborating mass-production and standardisation?

Niels Bohr has pointed out that the limitation of the variety of possibilities of the states of matter, which follows from the fact that energy and action can only occur in definite amounts, has the most profound consequences. It is the explanation of the remarkable stability of matter. If matter were capable of infinite varia-

tion, it would always be in a formless flux, and nothing would take any durable shape. The artist of the universe would be trying to work in water, instead of the rigid elements which provide him with materials of clay, or platinum or granite.

At the beginning of this century it became evident that light sometimes possesses the properties of waves, and sometimes those of particles. A generation later, physicists received yet another shock. They discovered that electrons and other little chunks of matter not only behaved like particles but also like waves. It was found that all the phenomena of Nature have a dual aspect, one which is particle-like and the other wave-like. The difficulties arose through trying to describe one aspect by the method suitable for the other and, naturally, square pegs did not fit round holes.

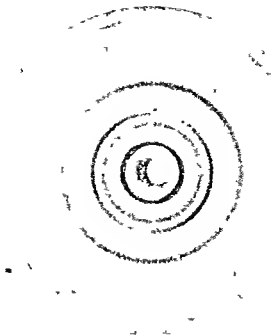
This was very confusing for those who insisted on trying to describe the behaviour of atoms and rays in the language of everyday life. But it did not bother mathematicians, who have invented a new language which enables them to deal with such dual phenomena with ease. This language is named non-commutative algebra. In it, $A \times B$ is not equal to $B \times A$. If you subtract one from the other you do not get nothing, but a multiple of Planck's 'quantum.' The antics of atoms, which cannot be logically described in ordinary language, can be described with perfect logicality in the mathematical language of non-commutative algebra. But you cannot attach any complete visual picture to the operations described in this language, as you can to the operations of everyday life.

If you direct the beam of a searchlight on to an enemy cruiser, you do not push the ship out of the way. The light is reflected directly back, and in virtue of this, reveals exactly where the ship is. This is true enough in ordinary life. The battle of Matapan was based on it. But it is not absolutely true. The beam of the searchlight *does* push the ship it falls upon, but so slightly that the effect is negligible. But an electron is bounced out of the way by light, at high speed, as we learned from the effect of ultra-violet light on zinc plates. Thus we are in a quandary when we try to *see* an electron. The means with which we try to see it interfere with it. There is no way of getting round this difficulty. The only means that we have for determining the position of an electron, for showing it up, knocks it from where it was, so we can never be quite sure of its original place. There is a fundamental element

of uncertainty in our only means of determining its position. This is the famous Principle of Uncertainty. It is fantastically simple and obvious, but all the genius of Heisenberg was needed to recognise it. Thus he did by putting the facts into very unfamiliar mathematical dress. He was thus enabled to look at them without any common preconceptions. The greatest achievement of the human mind is to escape from prejudice. When this is done, reality is often found to be quite simple. This in turn happily enables ordinary people to learn the new ideas, until they become the basis of the new common sense. Our grandchildren will find the Principle of Uncertainty as acceptable as the Multiplication Table. If P represents the position of an electron and M is the product of its mass and speed, then Heisenberg says that if P is very accurately determined, the value of M will be uncertain, while if M is very accurately determined, that of P will be uncertain. Accurate determination of them is mutually exclusive.

The fact that the pressure of waves of light cannot be neglected in the exploration of the atomic world has tremendous philosophical consequences. It means that in the realm of individual atoms scientists cannot completely separate object from subject. In Newtonian science the physicist is a passive observer. His own observations are not supposed to interfere with the course of Nature. In fact, besides the distinction between object and subject, everything is sharply separated from everything else, space from time, mass from speed, etc. In Einsteinian science the absolute separations of space and time, etc., have disappeared. But there is still an absolute distinction between object and subject. This enables the subject to discover sequences of events in the objective world he is observing. He can find laws which will indicate how a given cause will have a certain kind of effect. The law of causality will hold.

But in the science of the atom, of Bohr and Heisenberg, object and subject cannot be separated. If the subject is always interfering with the objective world, so that he can never, as it were, see the objective world as it really is, he cannot find closely-knit sequences of cause and effect in what he is observing. Thus the laws of causality do not strictly apply to the world of individual atoms. In the nature of things there is always a degree of uncertainty. Since the beginning of human consciousness, experience with common objects has led to the growth of the ordinary ideas of space, time and causal law. These came to perfect expression



X RAYS BEHAVING LIKE WAVES

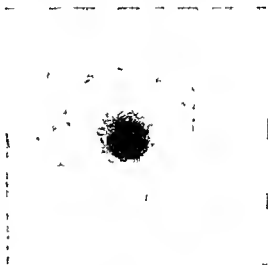
The rays have passed through a powder of fine crystals. They are reflected by the regular rows of atoms in the crystals. The various reflected rays interfere with each other, so that the emergent beam is striated, being darker in some places and lighter in others. The effect is characteristic of wave-motions, and a similar phenomenon may be seen in sea-waves crossing each other on the shore. Sometimes they reinforce each to double the size and sometimes they cancel each other.

through the mind of Newton. He was the perfection of common sense. The unfamiliar objects of the big and the little require a new set of rules for their description. You will find that if you try to describe the behaviour of atoms in ordinary space and time, then you have to qualify all your delineations with an element of uncertainty, or fuzziness at the edges—the photographic portraiture of the atoms is inevitably out of focus. Or if you insist on describing the behaviour of atoms by causal laws expressed in mathematical language, then you are forced to deny the urge to try to represent it by pictures in space and time. The details of atomic behaviour are unseeable, but predictable by mathematics.

Many persons are unhappy about this situation. They feel that the foundations of the universe have been loosened, that beneath the phenomena of daily life, chaos rules, and chance governs all. Even if this were so, it cannot be too energetically explained that it does not affect the surface of the phenomena of daily life, and

we live in the surface. All common objects, such as men and bricks, consist of millions and millions of atoms. These may be jumping about individually in all kinds of ways, according to rules in which $A \times B$ is not equal to $B \times A$. But in the aggregate of millions, the vagaries of individuals cancel out, and all together they form one staid lump, obeying the ordinary laws of causality, space and time.

You will object that there is always the chance that all of the individual atoms in our brain or body might decide simultaneously to perform the same unpredictable antic. Doesn't this prove that science is essentially shallow? The answer, as Darwin



ELECTRONS BEHAVING LIKE WAVES

A beam of electrons has been passed through a thin film of gold. Like all metals, gold consists of very small crystals. The regular arrangement of atoms in the crystals produces interference effects, just as with X-rays (G. P. Thomson)

has pointed out, is that the chance of a body departing noticeably from ordinary behaviour is so small that we should have to wait for a time quite fantastically longer than the estimated age of the universe for it to happen. The Principle of Uncertainty does not offer any practicable chance at all for the escape of brains and bodies of our own size from the bonds of determinism. It does not re-establish the prestige of Free Will.

The humiliating effect of modern quantum theory on the unreflective is due to its demonstration that customary modes of thought cannot be extended to everything. It is flattering to human conceit to imagine that all things in heaven and earth are subject to familiar modes of thought. But reflection should show that what has been achieved is really a much greater triumph than laying down the law for things of which one has no experience. By

sacrificing familiar modes of thought the human intellect has discovered laws governing phenomena outside the realm of common experience. It has found, too, that nature operates within the limitations of definite quanta, or packets of things. This means that Nature is much simpler than might have been expected, and therefore we have a better chance than we might have imagined of mastering it, and turning it to our uses. The sub-universe of atoms may be chaotic, but it is not unreasonable. If we are willing to invent new mathematical languages, we find we can describe it logically. The new ideas may seem bizarre at first, but we shall soon accept them as normal, just as we shall or do with the new ideas brought forth in painting, music, architecture, politics, and war. Modern quantum theory does not suggest that the foundations of Nature are dotty, nor that the Almighty has presented us with a cruel joke. As Einstein says: "Raffiniert ist der Herr Gott, aber boshast ist Er nicht," or, in American, "God is slick, but He ain't mean."

C. H. Waddington, in "Life from a New Angle" (Chapter 4), has described how biologists are transferring their attention from the ordinary aspects of living things to the way in which they work. They are ceasing to stare at things, and beginning to probe processes, and life is conceived as a system in dynamic equilibrium, rather than a stately arrangement of cellular bricks. Modern physics is going in the same direction. Attempts to visualise what happens in the atomic world are ceasing. A new pride is growing in the extraordinary fact that human beings should be able to invent a mathematical language which will perfectly describe things inconceivable to the pictorial imagination. Some mathematicians have concluded that the world must have been created by a Mathematician, because some of the things that have recently been found out about it can only be described by mathematics. It is true that Jehovah spoke Hebrew, and Zeus Greek, but oughtn't this rather to put us on our guard against those who now say that God is a Mathematician?

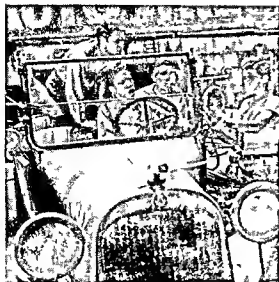
In the meantime we can get on with the voyage into the Unseeable, negotiating obstacles and blasting enemies, like a night pilot flying blind, with nothing more than mathematics and instruments to depend on. It is greater to be master of the night than the day.

KARL MANNHEIM

DEMOCRATIC PLANNING AND THE NEW SCIENCE OF SOCIETY

The century to come will be dedicated to the study of the social and moral sciences and to the problems of democratic planning

A sociologist, called Thrasher, once left the Ivory tower of speculation and descended to study the gangsters of Chicago. His idea was that reforms must be based on first-hand knowledge of facts, and that if, for instance, you want to reform bands of youngsters who are becoming a menace to society, the first thing to do is to find out what they are like, how they live and what determines their behaviour. But one isolated piece of knowledge is not enough ; so Mr. Thrasher studied no less than 1,313 gangs and came out of this experience with not a few observations of general sociological interest. He discovered that each gang is a world of its own, with its own peculiar mental climate ; but in spite of their dissimilarities the gangs have many features in common. There are similar ways of behaviour in all of them and similar social rôles. The influence of the small group upon its members becomes so strong that they are no longer able to adjust themselves to tasks which face them in life outside the group. For that reason Thrasher came to the conclusion that any attempt to reform or influence these boys must be addressed to them not as individuals but as a part of their group. It is useless to teach, lecture or preach at such youngsters ; the only way of reaching them lies through the group. If you succeed in putting across new ideals and ambitions to the whole gang you may hope to turn them into useful members of society. This is an important lesson for those who all too readily attribute misdeeds and errors to bad character, ill-nature or a sinful disposition, whereas very often they are only the result of misdirected vitality which could find no proper outlet in society.



DEAD-END KIDS

* A typical American gang of youngsters — a microcosm of group stimulation *

Photo. Universal Pictures

A friend of mine who deals with the problems of refugees in this country told me about a number of elderly ladies who could not find a niche for themselves over here since they had once seen better days and resented doing any work which they considered a social come-down. Finally someone hit upon the idea of forming them into co-operative squads whose business it would be to do urgent collective work such as cleaning hospitals or schools. Although this work is about as menial and *déclassé* as any offered to them privately they are enthusiastic about it and seem to forget all notions of prestige under the stimulus of the new group spirit. There is a new ennobling purpose visible in the group, and the new group redefined their social rôle. Without this experiment an observer would have thought that the character of these ladies and their attitude to life were fixed; knitting, embroidery, grumbling about the times and taking offence at any suggestion of work seemed to be their settled fate.

We are altogether too prone to think of ourselves and our fellow-men in fixed terms; a coward is always afraid, a shy girl is always retiring, a bad worker is always lazy and slow. But the coward may be very active within a rioting group and the valiant soldier may be easily cowed by his boss. The shy and blushing girl may be saucy enough with her mother and sisters in the familiar surroundings of her home; and the slack worker may prove to be a very efficient member of a team. Thus the elasticity of human behaviour seems to be much greater in various group settings. We form such rigid pictures of people only because we are accus-

tomed to seeing them in so very few established situations. The idea of influencing human behaviour not through direct command but through the manipulation of the group structure, i.e. the skilful use of social forces operating in the group, emerges as a new prospect of the future.

The same idea of utilising the self-regulating powers inherent in group life seems to have moved Homer Lane in his Little Commonwealth experiment. He asked the authorities to put at his disposal a number of the most incurable waywards and juvenile delinquents. He took them to live with him in a small isolated farm in England and imposed on them no rule or prohibition whatsoever. He let them do as they liked, and it is fascinating to see how a social order gradually grew out of complete anarchy—initiated, controlled and accepted by the rowdies themselves. When they arrived at the farm the boys behaved in the most unruly manner. In order to break their negativism Homer Lane made an experiment. He let the most offensive boy smash all the tea things with a poker and finally offered his own gold watch to be crashed on the floor by the boy. The lad held the watch high up in his hand but finding no resistance he broke down and could not destroy the watch. His negativism and resistance had been broken. After this climax the group began to build up their own world, inventing for themselves, so to speak, the institution of self-government. They laid down their own rules of conduct and gradually came to feel responsible for their own decisions and for the life of the community as a whole. Thus the self-regulating powers of the small group quite naturally turned these special incurables into citizens with a sense of social responsibility.

The Soviets have also made use of the group method. In their concept of socialist competition they used competition between groups as an incentive to work. They found that the very same person who was pushing and self-assertive under conditions of individual competition became loyal to the group when organised as a team in competition with other groups. It is the spirit of the playing fields of England which has been transferred to the schools, factories and farms of Soviet Russia. It has transformed the self-centred worker into one who voluntarily undertakes to help his co-worker in order to raise the output of the group to which they both belong. Similarly the intelligent student helps his less gifted fellows, for the work of the class is the responsibility of every member of it.

These examples have one thing in common they show a new approach to the study and understanding of man. In the past our best psychologists, philosophers and educationalists thought of man as an individual, such as one encounters in daily contacts with friends, patients or students. Thus they saw him as an isolated individual and unconsciously always pared away his social background. In consequence they understood only the individual approach to man. They saw, for instance, the teacher teaching his pupil, the minister appealing to the individual conscience, the psychologist observing his patient in the consulting room.

The new development in the sciences dealing with man is that they are tending to become sociological that is they do not sever the individual either from his group or from his social background, and they take into account all the influences working on him through his respective groups. The first stage in the realisation of the meaning of group life occurred when some writers emphasised how differently men behave in crowds and in isolation. At that time knowledge of man as a social being embraced only two aspects on the one hand the individual, who is always more or less reasonable and considerate, on the other the masses who are irrational and smash things and conventions. To many people social psychology and sociology still mean little more than this namely, the study of man in crowds.

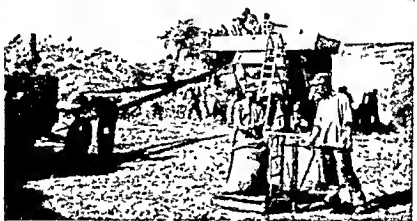
Thinking of groups or society in terms of the atomistic concept means no more than multiplying by hundreds, thousands or millions the behaviour observed in one individual. It is not yet sufficiently realised that group life does not consist only of being part of a crowd, but that there is a great variety of group patterns all differing in organisation and having a different effect upon the individuals who compose them. The family for example differs as a group from the sports team the club from the trade union. Through the functions it fulfils each of them produces a different appeal to the individual and elicits a different type of behaviour. It is these various groups which develop the most relevant standards for regulating our behaviour and conduct. There are no norms and codes in the abstract except those promulgated by social groups. There is the code of the Army the Church or the State there are codes regulating our home life or our business relations, there are the codes of the long established professions and there are also the autonomous codes of the gangs. In the same way there is no loyalty in the abstract only



THE PLAYING FIELDS OF ENGLAND

Competition between groups as cultivated in English Public Schools, a well-known method to create group loyalty and collective achievement

The Cricket Match at Tonbridge School, circa 1851. Reproduced by permission from the coloured lithograph by W. L. Walton after C. Tattershall Dodd, in the possession of B. T. Batsford

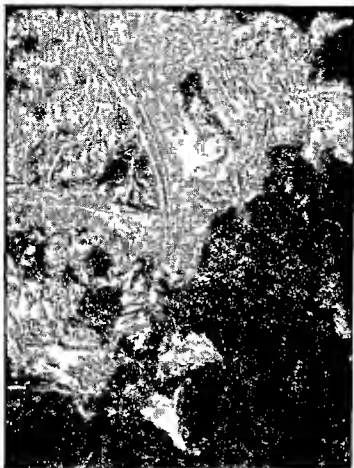


THE SOVIET VERSION OF THE PLAYING FIELD

The Russians have also made use of the group method. This shows a Russian collective farm. Peaceful competition for a common group aim has transformed the slow, backward peasant of Tsarist days into the eager, technically-minded collective farmer of Soviet Russia

loyalty to one or more of these groups. Where there is no group or institution, like the State, to co-ordinate these loyalties, chaos and uncertainty occur.

It is very difficult to grasp that fictitious being, the individual as such, who was so much spoken of in the atomistic period of thinking on human affairs. What we call the individual self, the subject in man who obeys norms and follows codes, is always



TRANSITION

In his painting of a young girl stepping out for the first time from the family group into the world of the grown-ups, the artist's intuition succeeded in expressing the different atmospheres of two social groups and the emotional tension of this transition

Renoir, "La première Sortie", Tate Gallery, London By permission of the Trustees of the Tate Gallery

correlated with these existing group centres from which codes and valuations emanate. There is not one tangible abstract self in each individual, but spheres of the self correlated with the groups to which he is attached. Out of the different rôles he plays, first as a child at home in the nursery, then as a youth at school and in the playground, then as a father and citizen and so on, he develops his own individual personality.

Personality does exist, of course, but not completely severed from and beyond these various social rôles. But we strive no more to safeguard its autonomy by assuming it to remain unaffected by time and circumstances, as we realise that out of the challenge

of the environment it emerges as a unique entity with a core and fate of its own.

In this respect modern sociology unconsciously follows a trend parallel to one which prevails, for example, in modern biology. (Cf. chapters in this book by Bernal, Chapter 2; Needham, Chapter 3; Waddington, Chapter 4.) Both seem to focus their attention on structure and organisation, and to realise the significance of these for the behaviour of the cell as well as of human beings. Of course, this is not a revival of the theory which regards society as an organism and uses the biological method for the study of human society; for beyond the structure analogy there are endless genuine sociological processes to which justice cannot be done in terms of biological concepts and methods. And besides, there is the problem of the personality which requires an entirely new approach.

In the same way, the study of behaviour in the abstract does not



CONTRAST BETWEEN TWO ATTITUDES

The Fascist dictator, in his commandment "To Obey, to Fight, to Believe", demands the obliteration of the self in total militaristic regimentation

Sir Thomas Gresham (1519-79), founder of the Royal Exchange, a mighty man and pioneer in his time, sought a balance between individual liberty and social responsibility. Observe his motto—"Love, serve and obey"—love to his wife and family, service to community and country, obedience to God and the Law

lead us very far. As we have seen in the case of the refugee ladies, for instance, there is a much greater elasticity in the average human being than we are willing to assume. If only the group configuration can be changed and the field of action altered, the behaviour of the individual will change with it. The ideal of the sociological approach is to develop a study of human behaviour in actual situations, based on the immense material collected by the historian, the anthropologist, the political scientist and economist, the sociologist, the educationalist, the social worker, the judge and others. Of course, this empirical material only becomes eloquent if one has the theoretical tools to analyse these experiences and the technique of relating the changing forms of human behaviour to the changing social background to which human nature adjusts itself. The belief that we understand society simply because we live in it is as false as primitive man's belief that he understood nature because he lived so close to it.

In view of the great wealth of insight produced by the sociological approach in so many fields, it seems surprising that science should for so long have overlooked the impact of the social setting upon the thoughts, emotions and actions of men. There is one main explanation for it—that on the whole, in the past, group life has worked silently in shaping man and ordering his conduct, and where difficulties have occurred man has made his readjustment to the changed conditions *unconsciously*. The miracle that happened to the old ladies and to Homer Lane's outcasts could occur only in small groups, the regenerating powers of group life remoulded their social character, provided them with new ideals and helped them to devise new methods of living together. Where the *declassé* individual, for instance, can see the value of his contribution to group achievement, he is elevated in his social consciousness and the sharing in a new purpose re-establishes his self-esteem from another angle.

Society at the stage of neighbourhood communities was partly carried on by the unconscious working of traditions, conventions, and by the self-healing powers of life within small groups. The break occurred when industrialisation and urbanisation brought into being the larger groups which cannot be managed on the level of unconscious evolution. At the very moment when group life ceased to regulate smoothly man's behaviour, the impact of groups and of the social background upon man's conduct and thought have become apparent. Like the kidneys in the human

body, we only notice these things when they cease to function automatically. For some time, it is true, there has been a growing consciousness that "there is something wrong with the world", a feeling that the individual is the victim of chaotic conditions and that society itself is out of joint. But it was only when science laid her finger on the sore spot that a cure became possible.

One of the chief causes of the crisis is that large scale groups have superseded the smaller groups in influence, and that their problems cannot be solved except by conscious thought and deliberate reform. The age of the great social reformers began when the traditional forms of adjustment in society failed to work. They concentrated at first on a few specific reforms, and only a few spheres of human activity came to be organised purposefully according to a preconceived scheme. But the idea took root and there has been a continuous process of social improvement from the early legislation on child labour and factory conditions up till the recent establishment of social work as a profession. This shows how more and more the evils of modern historical development can only be cured by purposeful interference. It is becoming obvious that social workers can no longer cope with the mass of problems that confront them unless they have a scientific knowledge of the causes and implications of individual and group maladjustment.

With the present multiplication of the problems of society we have come to see that the mere cumulation of isolated reforms without co-ordination only creates additional disturbances, or shifts the difficulties from one sphere to another. For instance, raising the school leaving age is only feasible if the consequences for industry are carefully thought out. Thus we have now reached the age of *planning*, when purposeful *reconstruction of society as a whole* has to be envisaged. Planning is not only a question of economics or of physical development, as many people still seem to believe. It must somehow take into account all spheres of social life. Reform at this level involves thinking out the far reaching consequences of any attempt to correct the shortcomings of the present system.

The first stage of planning is usually concerned with organisation, but the farther we proceed the clearer it becomes that no good can come out of institutional changes without a thorough awareness of their psychological implications. To think that planning consists of housing, social insurance or marketing schemes is to see only one side of the picture. The next stage is reached when

we realise that how people react to these separate schemes and how they are moulded by them is at least as important as the details of organisation. Today we know that a housing scheme is a failure if it fails to provide for the human needs of the tenants. Wherever the human side of planning is uppermost sociology provides for its needs, for sociology is that new *science of society which primarily observes human conduct with reference to the social setting*. For a while people were afraid of the application of science to human affairs and could only foresee therefrom regimentation and tactless meddling with our private lives. This undoubtedly can happen, it is the case in all Fascist systems.

To the Fascist, planning means militaristic regimentation, the application of the old pattern of command and blind obedience to every sphere of life. The *leitmotif* of Fascism is "to Obey, to Fight, to Believe". But this is a caricature of real planning.

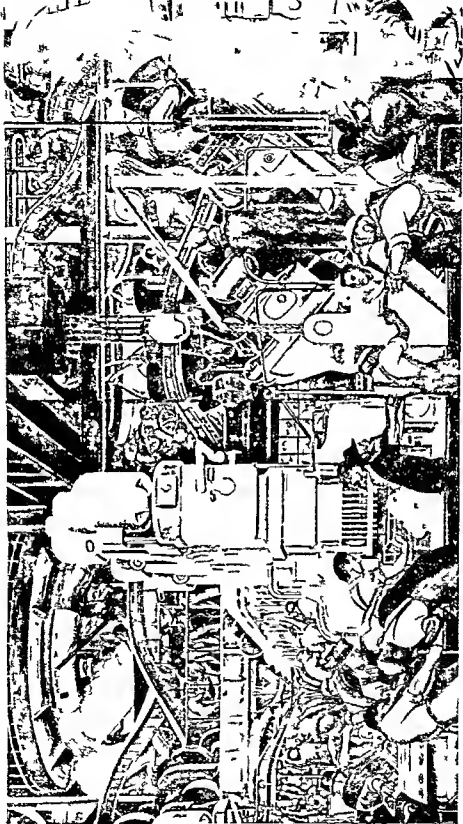
Real planning is democratic planning—not the direct manipulation of lives, creeds and beliefs, but a careful and tactful rearrangement of circumstances and the elimination of those handicaps which are brought about through the unwieldiness of modern large scale society. A planned framework within which there is scope for spontaneous adjustment will set free group forces which enable the wayward youth, the frustrated spinster and even the criminal to lead a healthier and more balanced life.

As a science sociology will not close its eyes to achievements in the art of human readjustment, wherever they may occur. If, for instance, the Nazis have contrived to liberate various social groups from their previous psychological frustration through the creation of collective enthusiasm in the interest of the whole system, this is in itself an application of a good sociological method, though for a bad purpose. Eliot's Archbishop (in *Murder in the Cathedral*) rightly says

‘ the last temptation is the greatest treason
to do the right deed for the wrong reason ’

In our context, *the aim of planning lends final meaning to planning methods*.

It is, however, not only the aim that makes democratic planning different from dictatorial and totalitarian planning, but also that it tries wherever possible to reduce central regulation in favour of decentralised decisions. Of course, in certain spheres central decisions are technically inevitable, as, for instance, in the Army, and even in modern economy a large extent of central direction



THE ASSEMBLY PLANT IS THE SYMBOL OF THE LATEST STAGE OF MODERN LARGE SCALE INDUSTRIAL SOCIETY

The artist gives us more than a vision of the cold cruelty of modern production—he reveals its grandeur and the hope of collaboration for a common aim which can give new dignity to the future if we rightly understand its message

is unavoidable. But even in these cases there is a great difference between democratically controlled decisions from the centre and the blindly followed commands of a Fuehrer. We have to find a democratic pattern of planning which relies on the self regulating powers of the smaller groups which compose society and on the natural balance between them, both for the sake of the individual and his fuller life and also for the sake of the survival of the nation as a whole. Here again we can see a parallel between the sociological and the biological sciences. In Chapter 3, Needham points out that it is not the mechanistic organisation, as that of Fascism, which has in the long run the chance of survival but "organisation built upon and growing out of the full nature of human beings at their best" (P. 38)

The defect of existing democratic systems is not that there is too much democracy in them, but that there is still too little, and that the spontaneity of small groups has not yet, either in the factory or elsewhere, been translated into conditions of large scale society.

To achieve this is admittedly no light task, and it will require the thought and experiments of at least one generation. No doubt we shall often fail, but one thing is certain: so long as we fail to make the democratic processes function within the framework of modern society, we shall be doomed to live either drifting in chaos or imprisoned in a cage.

LEWIS MUMFORD

LOOKING FORWARD

How to meet this changing world with a new type of social science

The achievements of modern technology have been part of a culture whose central theme was the seizure and exploitation of power. But although the quest for power led to the ruthless exploitation of natural resources, the break-up of the natural



Jacob Fugger II (banker of Augsburg 1459-1525)—the prototype of the pure capitalist, the financial despot. He reappears in every generation and his dominance symbolises the money economy which has held sway for centuries but may now be passing

balance of organisms, and the extermination of many valuable cultural traditions, it was not wholly a negative and destructive impulse. For up to the first World War this culture embraced people who lived in every part of the planet, and by means of an increasing interchange of trade, investments, and ideas, it brought over a thousand million people into a working partner-

ship In the field of politics there was a steady diffusion of power, through the spread of democratic and co operative methods of control

Unfortunately, technical improvements and economic facilities outran the moral capacities of the peoples who had fared best under this culture, and in particular of their governing classes The very illusion of moral progress that was fostered by the prevailing optimistic philosophy of the nineteenth century tended to conceal the vast hiatus between technological and social achievements

The underlying axiom of this power culture was that the increased use of non human sources of energy, and the increase of wealth through the mechanisation of the means of production must automatically increase the possibilities of human well being This axiom, as Arnold Toynbee has amply shown in his *Study of History*, has no factual basis Though there is a close relation between technics and every other aspect of human culture, material abundance often goes hand in hand with social decay

As a corollary to this prime assumption about the desirability of material expansion went the notion that the increase of 'power and wealth' had no limits, because human desires were boundless and insatiable This corollary was as baseless as the axiom itself, it was merely an illusion which assumed as given the very fact that remained to be established the notion that human satisfaction increased in proportion to the number of human desires and to society's capability of satisfying them That vulgar notion has been responsible for a great deal of human misery For the experience of the race has abundantly shown that moderation and restriction are essential to human well being in every aspect of man's existence This is true on the physiological level, since three dinners at a time are not three times as satisfactory as one, and it is true on the moral level, where the moderation and equilibration of desire have proved organically satisfactory, whereas its inordinate expression, or inordinate contraction, leads to conditions of social and personal maladjustment

When Lord Acton said, "All power corrupts and absolute power corrupts absolutely," he, of course was referring to political power But what he said likewise applies to power in all its manifestations The more energy that man commands the more important it is that this energy should be at the service of his whole personality and his whole culture, and not merely at the command of some narrow ambition or some limited goal Now the fact

is that science and technology, for the last three hundred years, have been at the service of narrow, and often, one must say frankly, primitive, notions of human development and human well being. They have given power to the military and political and financial despots—they have fed their egos and justified their ambitions, they have further brutalised the brutal and corrupted the corrupt. As a result they have made mankind the victim of the machine rather than its benign commander and controller. Although many high and humane achievements remain, the animus of this civilisation has been a predatory one.

The familiar doctrines of technological materialism are without a sound sociological or psychological basis, and that by itself would be enough to condemn them from a human standpoint. But there is still another way in which their insufficiency may be demonstrated, and this is by reference to the facts of historic development. Technological materialism itself represents a passing phase of human history. The great age of expansion which it fostered is now coming to an end, the conditions that turned men's attention exclusively to the conquest and exploitation of the material environment have been subverted by the very success of Western man's enterprise and invention. We are now probably living through the last great crisis in this power civilisation. This crisis will either ruin Western Society entirely—and with it the very techniques of physical science and mechanical invention—or it will permit this culture to establish itself on a much broader human basis. In the second instance, the process of materialisation, by which one may characterise our culture during the last three centuries, will give way to a process of "etherealisation", to use a term coined by Toynbee—quantitative interests will become secondary to qualitative interests, and the great advances that were once made in the physical sciences almost exclusively will now be paralleled by progress in the domain of sociology and personology—sciences which themselves will no longer be dominated by the categories and methods of the physical sciences.

This change within the domain of thought is the counterpart of a wider social process, as it is, no less, one of the means by which further social developments will be guided and applied. If we are to understand both its significance and its necessity, we must understand first of all how completely our technological achievements in the past have been conditioned by the historic movement of expansion—the land expansion of the conquistador and pioneer,

the mechanical expansion of the inventor, the industrialist, and the financier, and finally, the population expansion which was the source of the vital energy of Europe during the nineteenth century

The first thing to note about modern technics is that it is associated with the period of land expansion in the Western World, which began in the fifteenth century, when Europe had reached the limits of its own frontiers. This period of discovery was accompanied by a steady pushing back of the physical horizons, and it was marked by the quick spread of the European from his original habitat to the remotest shores of Asia, Africa, and America. Here was an attempt to break away from the bounded and walled horizons of the mediaeval city, an attempt to treat the whole world as the habitat of Western man and as the object of his curiosity as well as of his cupidity.

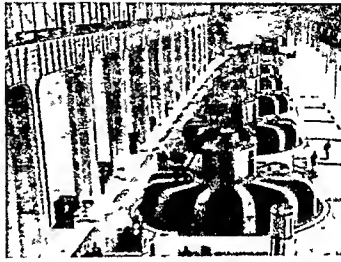
This world-wide immigration and colonisation was itself the complex product of economic interests, seeking to widen the area of trade, of a missionary impulse to spread Christian doctrine, which grew up again with the new prevailing orders, and of new technical instruments for commanding space and time. The compass, the three masted ship, the sailing chart, the accurate ship's chronometer—the latter not invented till the eighteenth century—made possible the era of exploration and colonisation. It would be impossible to exaggerate the effect of the new spatial horizons upon men's minds. Samuel Morse's impulse to invent the electric telegraph dates from the moment when the lonely young American painter, in London, felt the gap between himself and his family, filled only by letters, to be an unbearably long one.

But the technical results of exploration and colonisation were not one-sided ones. Though the Western European by the nineteenth century had distributed his firearms and his friction matches, his steel hardware and his missionary pocket handkerchiefs all over the map, he rapidly acquired, from the primitive peoples he conquered by his "superior" civilisation, a greater abundance of resources and technical methods, which could be utilised by his advancing industry, than had been diffused by slower processes during the previous few millenniums. This account has never been accurately reckoned up, as far as I know—perhaps because its results would diminish Western man's self-satisfaction and conceit. If, however, one goes no farther back than the fifteenth century and takes nothing more away than printing from movable types

Pittsburg—a bad example of industrial environment and blight produced by laissez-faire capitalism - smoke pall, air pollution, disorder



Interior of the giant power station at Dnieprostrov, U.S.S.R. The calmness, cleanness and order of the Neo Technic environment prevail in the power station or the factory as in the kitchen or bathroom of the individual dwelling. In any one of these places one could "eat off the floor"



from Korea, cotton fabrication from India, porcelain manufacture from China, rubber culture from the Amazons, and the new food crops that came from the Amerieas, the effect would be to bring the whole Western world to a literal standstill and to the verge of outright starvation. At all events, it is extremely doubtful whether anything that could be compared with modern technics could have resulted by the twentieth century out of Western man's unaided imagination. The mechanical conquest of the planet, by means of the sailing vessel, the steamship, the railroad, the cable, the telegraph, the radio—and above all, perhaps, by gunpowder—was a means by which the technological contributions of hitherto isolated cultures were enabled to influence the whole Western world. This happened at a moment when Western man's interests were becoming almost exclusively technological and materialistic ; and it therefore had an overwhelming effect. Now, this period of land expansion has finally come to an end. What was true of the United States around 1890, as Frederick

Jackson Turner pointed out, became true of the whole planet during the fifty years that followed. Siberia, Manchuria, and a few scattered outposts around the rest of the globe were the last regions to undergo the invasion and exploitation of modern man. The period of one-sided conquest now has come to its own natural terminus: the process of surface exploitation, of wholesale migration and colonisation, with its careless wastage of capital resources and its greed for quick returns belongs to the past.

We are now entering a period of settlement or rather of resettlement, and this involves the attempt to find a stable basis for living in the environments that have proved most favourable to human life. There are vast damages to be repaired: deforested areas to be restored to woodland, eroded soils to be built up, more organic patterns of living that are to be reinstated, and if science and technics are to benefit by the stimulus of other cultures, there must be a world-wide give and take, as between equals. Political skill must keep open the world-wide channels of intercourse and interco-operation, once established crudely at the point of a gun for the benefit of the Western exploiters.

But at this point it becomes obvious that the conditions for further technical advance, through the stimulus of other cultures and ways of life, rests not upon technicians and scientists, but upon political affairs that lie far outside their immediate sphere of control. Once, the political instruments of cultural intercourse could be taken for granted: foreign scientists and explorers travelled freely in the remotest parts of the world, even without passports, unless they aroused purely local animosity they could come and go in safety and freedom. For the last twenty-five years the common vehicles of such intercourse have been one by one disappearing. The totalitarian States are even in times of peace closed régimes, the democratic States themselves have shared this vice in some degree, as compared with the open world which existed generally before 1914.

The danger should be plain. If each great State or Empire became a rigid, self-contained unit, immune to outside influences and foreign ideas, the social basis for technological advance, which historically involves world-wide intercourse at all levels, would disappear. Doctrines of political and cultural isolationism—which are sometimes heretically preached even by men of science

—are based upon historic ignorance as to the actual foundations of our present culture

Now, world travel and intercourse rest ultimately on world trade. It is the passage of surpluses and specialities across regional frontiers, making available the means of exchange, that enables other people, besides the merchants involved, to travel freely and exchange their intellectual products. Where no such medium is available, the investigator who wishes to become familiar with foreign thought or techniques must either imitate Alexander, and come with an army, or he must follow Plato's reputed example when he went to Egypt and covered his expenses by taking with him a cargo of oil which he sold to the Egyptians. Otherwise only beggars can be travellers. Already there are States in existence where Plato's method would be impossible, even if he were not denied a visa or stopped at the frontier because he was not a believer in "Aryan" anthropology or in "Marxian" genetics.

If the closed totalitarian States should remain in existence for as much as another generation, the international structure of scientific thought will probably break down flatly. Even before the present war passed into its active phase, the tactics of the German and Italian governments had made the procedures of so-called International Congresses almost a farce, for they were either used as a vehicle for Fascist propaganda or deprived by the instructions of these totalitarian governments of some of their most valued contributors.

To mark the change that has taken place here one need only compare the treatment accorded to the Belgian historian, Henri Pirenne, during the World War, with that accorded to representative scientists and scholars in the totalitarian States during the last ten years. When Pirenne was taken in custody by the German Government, after the occupation of Belgium, that fact was quickly known to the rest of the world, and the expression of outrage was universal. Danish and Dutch scholars dared to denounce it, no less than Americans. As the result of a world-wide protest, headed by President Wilson and the Pope, he was taken out of a prison camp and sequestered in a quiet German village, with no other duty than that of reporting to the Mayor once a day. That was in wartime. Outrages a thousand times worse have been committed by the Nazi and Fascist governments against world-respected scientists, sometimes without the news coming out, frequently without arousing a single organised pro-

directly from Pettigrew's and Marey's study of the locomotion of animals

Meanwhile, the application of biological knowledge to the raising of food and to the planning of the human diet has effectively altered the whole problem of man's health and his survival, genetics and the new discoveries on the physiology of nutrition have done far more to assure mankind of an adequate food supply than all the gangplows and automatic reapers and binders that the nineteenth century boasted. We are now aware of many processes where chemical, biological, or social science will enable us to provide an alternative for the purely mechanical solutions that were chiefly available during the palæotechnic period. All these applications of biology are still in an early stage.

Let me give a simple illustration. By the use of costly apparatus and machinery it is possible to build a house without windows, in which the air shall be filtered, warmed or cooled, and circu-

Sculpture by Constantin Brancusi—modern abstract and constructivist art is in tune with the age



Section of spring—purely utilitarian in origin but beautiful. The present perception of the special qualities of modern machine forms was one of the prime discoveries of Brancusi and the sculptors in glass and metal like Antoin Pevsner, Moholy Nagy and Naum Gabo (see Plate XII)



lated, and in which sun lamps, applied at intervals, will make up for the need for natural sunlight, such a house will work almost as well in a crowded slum as anywhere else. Unfortunately, such an "advanced" technical form is compatible with hideous social disorder and economic waste—just as mechanical advances in war are, as in Germany, compatible with political barbarism. But without the full employment of other arts and sciences, such a house is actually a monstrosity. By utilising current knowledge of meteorology, a house can be oriented and designed so that it utilises to the full all available sunshine, by utilising the political art of town planning, the house can be assured permanent open spaces, pure air, freedom from noxious gases or effluvia without any provision of special machinery, by saving on the cost of mechanical equipment, interior space and exterior gardens can be provided whose utilisation and pleasure will help keep the occupants in health and psychological balance. In short, by employing all the knowledge at his command, the architect and planner of a modern community can reduce the expenditure on mechanical utilities, and create a far more effective human environment.

This simple example has a much wider bearing. The progress of the biological and social sciences will result in a shrinking of the province of the machine. Here, I believe, is a fact of deep significance, its implications have still to be grasped.

The coming utilisation of social and political skills rests with another condition, which held true even before the development of modern science, and that is, there is some relation between the degree of personal culture that prevails in a community and the quantity of physical goods it desires and commands. One can put this in a crude and comic form by saying that if all men were honest there would be no need for locksmiths and safes, if all men were co-operative there would be no need for handcuffs. In such simple relations it is easy to see that the achievement of a higher degree of moral culture would not result in a new form of machine, it would result in the elimination of a particular mechanical contraption.

What does this mean in the broader picture? It means that an effective transfer of interest to the realm of ethics and æsthetics will result in a diminished demand for the machine and its products. If the use of speedy motor cars is the chief means of utilising leisure, it is obvious that the output of motor cars, highroads,

steel and concrete, and all the accessory supplies and services will increase but if other means of utilising leisure become popular, if more people paint and write and model and carpenter and garden, if more people study the stars and observe the behaviour of children or become outdoor naturalists, there will be a lessened demand for swift agents of locomotion purely for the purposes of recreation. A transfer of interest from the mechanical to the organic and human may be properly regarded either as a labour saving device or as a brake upon production. At all events it introduces a new factor not embraced by the crude doctrine of "increasing wants". Such a change is one of the real possibilities that follows from a better scientific knowledge of the human personality.

Plainly, the process of etherealisation has always been possible. There is plenty of historic evidence to show that it actually took place in Roman civilisation, from the first century B.C. onwards, and that it contributed quite as much as the invasion of the barbarians to overthrow that society. Perhaps the chief problem of our society is to make allowance for these submerged and block-headed human impulses, left out of the mechanical world picture, without permitting them to undermine and disrupt our whole civilisation through their uncontrolled eruption.

The fact, at all events, should be plain. Those who have put their faith in mechanical inventions and in the power theme have failed to see that only a modicum of our constant human needs is encompassed by the machine or included in the territory it conquers. We know pretty definitely that men do not live by machines alone, and that the power impulse, however deep and ineradicable, is not a self-sustaining or a self-sufficient one. This is not to deny the importance of the machine in its place; it is merely to acknowledge the fact that it is not a substitute for art and love and fellowship and beauty and contemplative understanding. Many vital human needs have been frustrated by our one-sided over-emphasis on the quantitative and mechanical. This is true both in thought and in social and personal development. Indeed, as Karl Mannheim has shown in his books, the hiatus that now exists between those parts of our life that have been rationalised by the machine and those parts that lie outside its scope, constitutes one of the gravest problems of present-day society. There has been, he points out, an uneven development of the human faculties. A diversification and balance of interests

good, acceptable group leadership is a basic principle of good management as well as of democracy.

Through the centuries until recently the picture of a manager does not seem to have changed much in the essentials. In pre-history perhaps a crippled old crone sat in a dim cave and others crept in and told her what they had done and asked what they should do next. Or the leader might be a young warrior chief, agile, courageous and first among his fellows. Later, as the idea and power of private wealth developed, it would be someone endowed beyond the rest by inheritance and training. The Squire, say, or the Guild leader. Then on to the early days of the Industrial Revolution, when it would be the small predatory capitalist, who owned tools and plant and managed to make others operate them for him, using the newly harnessed steam power. The manager was always the recognisable and acceptable group leader.

It was only towards the end of the nineteenth century that the idea began to develop of management as a science, quite apart from the principles of leadership or ownership. In the cycles of unplanned industrial politics, production had at that time again outstripped distribution. Firms competing with each other had grown beyond the stage of the one-man business in *laissez-faire*. Large groups of persons with large amounts of plant and machinery were now in existence in the various industrial countries of the world. And through "bad times" there appeared a need to make more economical and scientific use of the labour supply and plant in each factory.

So, the name of a man now famous, F. W. Taylor, began to be known in the more intelligent management circles. He demonstrated how the efficiency of any particular production unit could be improved by breaking down and studying in close detail all the operations and movements employed. With rigid logic he analysed motions in relation to time and to available human muscular energy in the various processes of production in the factories with which he was associated. On these analyses he fixed piece-work rates and output bonus schemes for the workers. Logically, he appreciated also the important psychological need for the worker to have some share in the increased profits accruing from the adoption of scientific methods. Consequently, a new conception of management was born. Mass production factories were developed, factories in which the owners made colossal profits, and in which the workers, while they were employed there,

GEORGE DICKSON

EVOLUTION IN MANAGEMENT

How to put a heart into the industrial world of today and tomorrow

Other chapters in this book show how revolutionary the process of evolution has become in the world today. This is no less true in the field of modern industrial management. It is a fact that a well trained, fully experienced modern manager, can govern with equal facility the activities of individuals in any of a wide range of different industries from a coal mine to a soap factory, from a shipyard to a rubber company. He knows how to employ specialised technicians and how to enlist, assess, balance and co-ordinate with adequate reward the groups of individuals required to support the machinery of modern production and distribution. In fact, in so far as the changing economic picture allows him to dominate the scene, the modern manager is a figure of whom, I guess, our various thoughtful writers have taken too little count. For it is not generally appreciated that in attempting to devise schemes for new styles of government, management and government are synonymous words.

To the student of humanity there can be no grander job of work than that of managing a modern business that employs just enough individuals to allow the chief manager to be at least on nodding terms with every one of them. In the company I manage there are about a thousand of us, and I know many of our people intimately and am acquainted with all of them. Contemplating my job of management and considering how it fits into the general scheme of things, I like to reflect on the evolution of management through the ages, and to appreciate the fact that management without good acceptable leadership is soulless (or heart less). In other words, the manager must be acceptable to the individuals whose activities he manages. Free association in groups with

good, acceptable group leadership is a basic principle of good management as well as of democracy

Through the centuries until recently the picture of a manager does not seem to have changed much in the essentials. In pre-history perhaps a crippled old crone sat in a dim cave and others crept in and told her what they had done and asked what they should do next. Or the leader might be a young warrior chief, agile, courageous and first among his fellows. Later, as the idea and power of private wealth developed, it would be someone endowed beyond the rest by inheritance and training. The Squire, say, or the Guild leader. Then on to the early days of the Industrial Revolution, when it would be the small predatory capitalist, who owned tools and plant and managed to make others operate them for him, using the newly harnessed steam power. The manager was always the recognisable and acceptable group leader.

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obeying the rigid rules of the system, also earned very high wages compared with what they could earn in factories not managed according to strict scientific method.

To the protagonists of big business, scientific production management became almost a gospel—although its general adoption in competing factories was bound to prove only a temporary relief from the bad distribution bulges on the trade cycles. Then a mechanical war of infinite magnitude requiring colossal quantities of articles to be produced—the 1914 war—put scientific production management right on the map. And it *did* become a gospel, remember, with Henry Ford as high priest preaching it. After that war was over and the demand for low-priced motor-cars seemed to suggest to him that mass production meant everything to the human race, he caused books to be written showing the way.

But production is only one aspect of management. Difficult and complex though modern production may be, it requires from the modern manager only an intricate and concentrated development of the type of production management exercised in the one-man business of the nineteenth century. For he has economic power to exert a great measure of control over the resources of Labour Supply, Tools and Plant, Buildings, Raw Materials and Transport, at his disposal. Modern management is more than just skill in controlling labour. It also includes the co-ordination of many other factors such as the enlightened use of science (new technical processes), art (the architect to build the factory, other artists to design the products), and the synthesis of production with distribution (retail trade). Complete management also has some control over consumption (through advertising), and it is now clear that we must give increased attention to the balance of distribution and consumption ; too much emphasis has in the recent past been concentrated upon production alone. Distribution is essentially the complement of Production (just as taking is complementary to giving). But so far, in unplanned States, distribution has necessarily been to a great extent beyond the control of an individual or even of a group of managers, no matter how progressive in outlook they might be.

The limitless potentiality of mass production, when it appeared, soon brought in its train the need for the scientific development of statistical research into markets, costs and prices. In other words, where previously rule of thumb bookkeeping had been good

enough to allow the manager to assess the economics of his business, scientific production management made it imperative, particularly with the vastly increased amount of share capital involved, to develop scientific accountancy. At any given moment when the production processes had been broken down into detail, and a vast amount of goods kept pouring out towards the consumers, it was necessary for the manager, just like the captain of a ship, to consult statistical diagrams and charts from which he could study trends and gauge the direction of the business and pilot the course. From Wall Street to the Paris Bourse, from Chicago to London, in the period between 1920 and 1930, this need for better and more scientific economics for industry yielded a happy hunting ground for go getting "business consultants and advisers." With the rapid growth of transport and communications, providing one knew what the consumer wanted, and could deliver goods at a keen mass produced competitive price, the physical process of distribution was simple—a flood of salesmen and a traffic staff, not too highly paid, could take care of it easily.

What a mad period it was to contemplate! Poverty and Plenty side by side in boundless measure. Had the developments of science outstripped the human capacity to live efficiently yet happily as individuals? It was the period of the development of the Fascist State idea, the beginning of the U.S.S.R. five year plans, the 1926 General Strike in Britain, the fabulous American Trade Boom, group gangsterdom in big business, the proven failure of the League of Nations, Japan going imperialist into Manchuria. And in management of industry, the stop watch experts, the market researchers, the chart and graph manipulators grew in power and prestige, the technicians of this "scientific" management who could, it was claimed, for a price, take businesses just like that from "out of the red into the blue." It was a pitiful period for the faithful ones who believed that good management should be good acceptable leadership of fully integrated and coordinated groups of individuals, whether in the stone age or in the latter day machine age with its technical complexities. It was a pitiful period. But it did not last long. Around 1930 the gongs of doom boomed again all over the world. Another decade of management began.

For the philosopher this can all be viewed as a process of evolution, but, with an impassioned faith in the human need to develop a system of democratic living based on intelligently devised group

management, I see the beginning of a revolution in the 1930 slump. Except in the U.S.S.R., where there may have been some immediate benefit from a panicked capitalism elsewhere, that slump hit all sorts of firms all over the world. It did not matter much whether they employed "scientific" management or not, they felt the bottom had been knocked out of their industrial world and it was beyond the powers of any known type of management to save them. On every hand one could hear bleating, pathetic pleas for a dictator to tell them what to do. From 1930 to 1940 there was a period in which management thinkers began to realise that, although we had discovered scientific production management, and scientific economics management, it might be impossible without a totalitarian state to discover scientific distribution management for the consumer, or a scientific method of organising our methods of research, development and planning so that commercialised industry could give sociological satisfaction to a nation conditioned by a tradition of independent individualism. Consequently, the doors of industry were opened to let in a lot of revolutionary thought which spread deeply during the thirties right up to the early summer of 1940, when industry began to grasp, in Britain at any rate, that we were in a total war and that total war required co-ordination of the activities of every individual in the community.

In this total war we are told we are fighting for democracy. As a manager, I often wonder what our people really think. Are we fighting to preserve democracy or to get it? Or a bit of both? For in democracy it is cardinal that co-ordination of the activities of all individuals means willing co-operation between the leaders and the led—a more difficult achievement in industry than it is in the regiment on the battlefield. It was the sudden 1940 appreciation of our need for total co-ordination of all our efforts in British war production that seems to me to date the birth of the latest era of managerial evolution.

The kernel of my story so far is the inauguration of the scientific management idea some forty or fifty years ago and its fluky development under capitalism since then. Along with the launching of that idea, however, there came another factor of even greater importance to the student of leadership and management. As I have pointed out, in the various industrial countries of the world about the beginning of the century large groups of

persons with large amounts of plant and machinery had begun to supplant the small one man business in *laissez faire*. The financial age of industrial mergers, trusts and combines had also opened. There is no need to sketch here that development. I would only point to the economic management complication that such colossal financial groupings created and note that it was generally within these larger groups, particularly from 1920 to 1940, that "scientific management" experts had their widest scope.

At about the same period, however, there was in Britain an even more important manifestation than either "scientific production management" or the development of trusts and mergers. This was the strong development of Trades Unions to protect the interests of the workers and to secure for them in many industries higher basic rates of pay, better working conditions and shorter working hours. At the same time, not so obtrusively in the public eye, there was the perhaps stronger development of Employers Associations to safeguard the interests of the employer when faced with the demands of Trades Union organised workers. By the same economic compulsion, in fact, that brought scientific management as a science into being, workers were driven with perfect "freedom of the individual" into their trades unions and employers into their associations and federations.

Although the general public has been fed on news stories of strikes and lock outs from time to time, little emphasis has been put on the continual and immense amount of patient negotiation and agreement that takes place between groups of employers and groups of workers through the organisation of the Trades Unions and Employers Associations. I am on an Employers Association executive committee, and although I take little active part in the discussions on wages and am more concerned with the development of good apprenticeship schemes, I am always amazed at our monthly meetings to read through and hear the many reports of what has been accomplished in the month between our Engineering Employers Association and the Trades Unions. It is most exceptional for a strike or lock-out to take place over some point of disagreement. Let me give you an example of what happens in the engineering industry since it is much in the news of war production.

There are agreed basic rates of pay and agreed hours of work to govern overtime. These are minimum rates, but piecework and

bonus systems in most establishments normally allow the worker to earn a wage considerably more than the minimum. To make piecework or bonus easily possible there must be a certain amount of repetition in the work to be done. Repetitive work seldom requires the highest degree of individual ingenuity or skill. That leads us to the instance of the toolmaker. Without his fundamental work it would be impossible for the less-skilled worker to get jigs and fixtures on which to earn his high piecework wage. Yet the toolmaker's work can seldom be gauged either for piecework or bonus. Therefore, in many war factories in different parts of the country we had the anomaly of highly skilled workers receiving very much lower wages than less-skilled or even unskilled workers, which was patently ridiculous. The Trades Unions and Employers Associations concerned, therefore, collected statistics from their members and through their chosen representatives initiated discussions on the subject. The result of these discussions was an agreement that in every engineering firm the toolmakers would receive an agreed percentage increase in their wages in direct relation to the wages earned by the other workers in the firm. That agreement applies generally to most engineering establishments in the country.

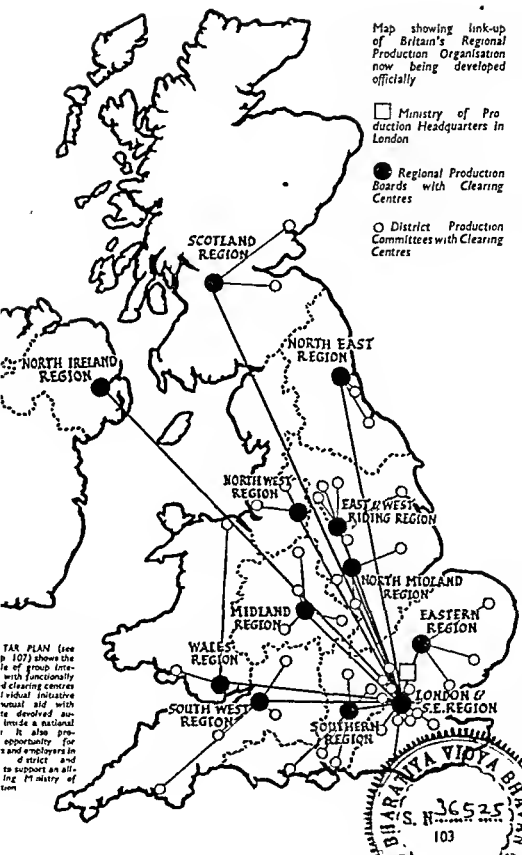
Now here is what I consider the most interesting development in the wages economics of industry. If in any particular firm a worker or employer suspects that the agreement is being broken—usually the worker, perhaps because he has less access to figures—a protest is made in the first place to the management through a shop steward who is an ordinary worker elected for this purpose to prevent victimisation. Usually the question is settled at that stage. In discussions with the shop stewards the management can disclose confidentially much cost and price information that cannot be published broadcast. If no agreement is reached, the shop steward then refers the question to his Trades Union, and the employer to his Association. A works conference is then arranged. Officials from the Trades Union and the Employers Association sit down together with the management of the firm and the aggrieved workers to see if they can clear the problem. This is usually successful. But, if not, the problem is then referred to a regional conference where employers and trades unionists from a wider field are brought together to clear the problem. Wider technicalities and precedents are then brought forward and discussed as evidence. Both sides usually try hard to get agreement at this conference, but, if it fails, the problem is then discussed by national

Map showing link-up
of Britain's Regional
Production Organisation
now being developed
officially

□ Ministry of Pro
duction Headquarters in
London

● Regional Production
Boards with Clearing
Centres

○ District Production
Committees with Clearing
Centres



TAR PLAN (see
p. 107) shows the
role of group inter-
action with functionally
divided clearing centres
for individual initiative
and mutual aid with
state devolved au-
thorities. It also pro-
vides a national
opportunity for
workers and employers in
the district and
to support an all-
ing Ministry of
Production

representatives of employers and workers who almost invariably agree on a compromise that prevents a strike or lock out

There is nothing dictatorial or autocratic in that process. It is the making of governing rules and agreeing procedure in consultation with those who are governed. The democratic principle. Rigid scientific management, like Nazism, lays down the rules and enforces them with an economic whip or bludgeon. An economic whip is only useful when there is a surplus labour pool. In a totalitarian State or in a democracy in total war there can be no surplus labour pool.

Economists tell us that we must in future achieve full employment also in peacetime (*vide* Beveridge). And the trend nowadays is to seek economic freedom for which in this country we staked our claim with Magna Charta. And economic freedom includes the right to adequate food, housing, leisure, education and security. Read *Fighting for What?* by Sir John Orr, and appreciate how much good agreeable management will be imperative for such a real victory. It is, therefore, gratifying to reflect that in our principal British munitions industries, while the influence of "scientific management" has had a considerable effect on estimating, rate fixing, job-costing and so on, as a pure and rigid science without compromise it has never become widely popular. The groups in the various industries have preferred consultation and compromise agreement on points of difference. I believe there is a sociological reason for this. Dr Karl Mannheim supports this view very strongly in his *Democratic Planning and the New Science of Society* (Chapter 7), moreover, some of the most important recent books on the subject, i.e. *Man and Society* by the same author, *Fear of Freedom* by Erich Fromm, or *The Social Function of Science* by Professor Bernal, or, if you like, the writings of Dr Temple, the late Archbishop of Canterbury, and many more, all provide logical reasoning for a faith in co-operative management and leadership based on the Christian virtues of mutual aid, as opposed to rigid "scientific management" which becomes so easily the tool of an autocratic group that seizes power. In my opinion the democratic significance of the new managerial evolution is that, in the factory, in the district, in the region and nationally, the manager, the group leader, *must* be acceptable to those whom he manages. But blind fumbling emotional faith is not enough in these dreadful days of brutal government of the individual more or less everywhere. If we

agree that management and government are synonymous words, it seems right that a manager should be permitted to offer his considered theory of the basic solution to the modern problem. My theory may be right, it may be over simplified, it may be wrong, but of one thing I am certain—that the future organisation of this changing world depends to a very high degree upon a successful evolution of management.

In my first paragraph, I stated the fact that a well trained fully experienced modern manager can govern with equal facility the activities of individuals in any of a wide range of different industries. He can only do so with success if he is fully supported by all the individuals he manages. To do this he must realise that the large group of his individuals is composed of an infinite number of smaller groups and sub-groups, all of which must be intelligently integrated. Every group, no matter how small, has its recognisable group leader. Therefore the chief manager as chief group leader must so organise and control his company that he has a line of support through the same channels, thus ensuring that the authority of leadership will always carry the burden of responsibility in true measure.

I find by experience that the most straightforward way to realise and then to achieve this seemingly complicated organisation of management or government is to look right into oneself as an individual and discover that, when all odd fancies and notions are discarded, the happy content of individual living is the genius of balancing only four major interests. These are Giving one's share, Getting one's share, the Past and the Future. In so far as the individual balances the content of these four major interests, just so far is he happy, be he peasant or prince. Therefore in my scheme, which I have called the Star Plan, I have chosen a five pointed star to symbolise this harmony, the top point representing the individual intelligence or genius, which controls these other four major points.

But every individual in the modern world, whether he likes the idea or not, exists only as a member of an infinite number of groups of other individuals with whom he has established community. He lives in a district, his district may be part of a region, his region is part of a nation, his nation might be part of an international commonwealth. Moreover, he is an engineer, or a farmer, or a coalminer, or a shopkeeper, identifiable with other engineers, farmers, coalminers, shopkeepers. But he is always an

individual Therefore through all the groups there must run strong lines of individual common interest on (1) Giving, (2) Getting, (3) The Past, and (4) The Future Consequently, it should be simple to make the main lines of management or government coincident with these four major lines of individual and group interest, which can then be more clearly stated as (1) Production, (2) Distribution (or Supply), (3) Economics, and (4) Development and Planning These four lines of group major interests must be co ordinated and controlled just as with individual major interests Consequently, in a business we should have the managing director with four chief managers equal in authority under him, and in a Government the Prime Minister with four chief ministers

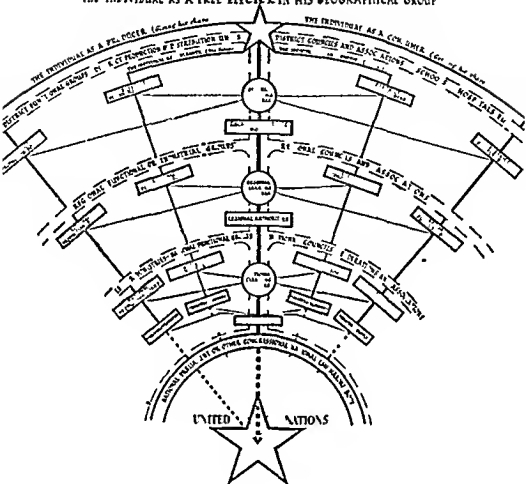
I have been criticised for over simplifying the problem thus but have I? Is it not possible to discern that what I suggest is already beginning to appear in British management and government, and that if we appreciate what is happening we can apply our minds and energies to speed the process, rather than suffer the bungling travail we have had to endure in the conception and birth of a Democratic Ministry of Production designed to cover our total productive resources in our war need?

In previous paragraphs I described what happened in the economics field of the engineering and allied industries, from the factories, through the districts and regions, to the national conference on wages and conditions of employment It is noteworthy that from these same industries, of so much importance in munitions production, came the greatest demand for a Ministry of Total Production Now, although the Ministry is still in embryo, we have "Joint Works Councils" in the factories where employers and workers attempt to clear production difficulties, District Production Committees composed of workers and employers' representatives with Clearing Centres for production problems too difficult for the factory, Regional Production Boards with worker and employer representation viewing and clearing production problems regionally, and although we have not yet obtained a National Production Board, we at least have won a Minister of Production with an advisory council of workers and employers viewing production problems nationally

As the new Ministry grows it is becoming generally appreciated that it must be responsible for *all* production management, and for the first time it is being realised that the Supply Departments of the Government are really concerned with consumer needs rather

THE BRITISH NATION

THE INDIVIDUAL AS A FREE ELECTOR IN HIS GEOGRAPHICAL GROUP



OUTLINE DIAGRAM OF THE STAR PLAN FOR DEMOCRATIC GROUP MANAGEMENT AND GOVERNMENT

In a democracy every national group leader or Minister should be ultimately responsible to the people through the Prime Minister and an elected Parliament. A simplified diagram may not indicate this clearly enough. The Foreign Minister, say, as leader of the group of people interested in foreign affairs, must obviously be responsible to the Prime Minister who is group leader of the nation, but in the Foreign Office there would be four chief departmental heads interested in (1) Production (2) Consumption or Supply (3) Economics and (4) Development and Planning. In the same way the Chief of all our armed forces would have as they almost have in the individual services now supporting him four chiefs of staff responsible for (1) Tactics (2) Supplies (3) Forces Economics and (4) Strategy. Each of these supporting chiefs would be in close and constant touch with his corresponding Minister who supports the Prime Minister so that all national activities would be integrated and synchronised. A good basis for democracy is given in the ILO declaration see Hansard 8.6.44)

than with producer efficiency and that it would perhaps be wise to have one Minister of Supply (Distribution) in the war cabinet as an opposite number to the Minister of Production so that when all our production resources are being reviewed they can be readily compared with all our consumer needs, either military or civil

With these facts before us, I therefore contend, as indicated on my Star Plan chart (page 107), every individual in our nation should be shown how he (or she) is integrated in his groups along the four major lines of his common interest, and governed according to his desire by an elected national executive in which, as now and without disturbing our parliamentary institutions, a democratically appointed Prime Minister should be supported by only four chief Ministers, i.e. (1) a Minister of Production, (2) a Minister of Supply, (3) a Minister of Economics, and (4) a Minister of Development and Planning, whose interests the Prime Minister will be expected to inspire, co-ordinate, balance and direct

This would be the nation's central governing body and the counterpart of intimate group integration for the individual citizen everywhere concerned with getting and giving his share to the community, the review of his past, and his hopes and designs for the future

In a modern factory it is exceedingly simple. The Managing Director is supported by his Works Manager, his Sales Manager, his Commercial Manager or Accountant, and his Chief Engineer or Chief Planner. In some businesses one person may double two or more of these group leading jobs, but in the main the four balancing interests are clearly separate in modern management, and the lines go out to and in from the humblest worker (1) doing *his* job well, (2) to please his customer, i.e. floor inspector, (3) for so much wage for a certain number of hours or parts, and (4) with his ideas about how best to do the job, his dreams of tomorrow and the day after

With all the statements and arguments we now hear about reconstruction and planning or about prices and wages boards in relation to our national finance, taxation and rationing, also, as I have pointed out, with our growing consciousness of the necessity to have—as an opposite number to the Minister of Production—a Minister of Supply who would assess, co-ordinate and express all our total consumer need, is it not obvious that from the lowest local authority or recognisable group of individuals anywhere, to the greatest international federation of nations that we can visual-

ise, our task of co-ordinating successfully all human interests will be soonest achieved if we recognise and organise along the four major lines of (1) we give, (2) we get, (3) our past, and (4) our future?

On this brief sketch of a plan I prophesy there will be eventually the noblest possibility of allowing true democratic management and group leadership to emerge. Then we will secure a form of government by which the governed individual will always be free in his courage to have an intelligent and effective voice in a scheme of things where good humour and sensitive sympathy will allow him to aspire to the highest personal standard of spiritual, moral, intellectual and physical integrity. By modern news dissemination we could have it now—if we would.

THOMAS BALOGH

REVOLUTION IN ECONOMICS

The new economic ideas which arose between the wars will have to develop still further

In this essay into the revolution in economic doctrines and the relations of economics and economic policy, we must try to answer the fourfold problem :

- (1) What was the intellectual reason behind the failure of the last "reconstruction" period
- (2) What is the revolutionary change in the technical basis of production
- (3) What are the problems of reconstruction now before us and how can we meet them
- (4) What are the indications that rational policies will be adopted?

The outlook is sombre. But only if we realise its threat can we hope to overcome the fearful obstacles in the way of a better future. Otherwise both in war and in peace, in peace especially, the habitual sloth or inertia, the reluctance to offend powerful vested interests, must triumph.

THE ECONOMICS THAT MADE HITLER

The doctrine of economics as it had been evolved by the 'twenties was, indeed, a nice and comfortable one—for those who were nice and comfortable. There was Equilibrium assuring the best utilisation of Scarce Resources for the Good of All. The Consumer ruled supreme. The impact of his Demand on Free Markets brought forth the Supply of just those things which were most wanted. Free Competition between producers secured that labour and material was used for the purposes where they were needed most and in the most Economic Way. At the same time, Free Competition also secured that the productive factors which

co operated freely in the creation of goods and services were remunerated exactly in accordance with the contribution each made in the effort to procure "tangible increments of the ingredients of real happiness" This wondrous perfection was accomplished, not by conscious planning, but automatically, by the interaction of countless entrepreneurs and workers trying to maximise their own gains The entrepreneurs were induced to produce what was wanted by the prospect of profit But if they miscalculated or refused to obey the dictates of Demand, or if they were inefficient, they were instantly eliminated by The Invisible Hand Similarly, any interference by the State or workers' combinations to secure higher wages was also fruitless The Economic Law revenged such infraction by "unemployment and a diminution of the value of capital"

And then, of course, there was Thrift Thrift, the essence of Progress By denying themselves the frivolous satisfaction of immediate fancies, the thrifty enabled and caused, by their impact on the Capital Markets, the production of Capital Goods Capital Goods, in their turn, by collaborating with Labour, increased productivity Things were no longer produced *à la* Robinson Crusoe, but in a Roundabout Way People made machines that made machines that made machines that made goods with ever increasing ease and less "real cost"

Yes, indeed, all was well and nice! And it was so comfortable, too Not only could the traditional and orthodox economist, as Mrs Robinson wittily put it, "explain to the privileged class that their position was morally right and was necessary to the welfare of society", not only could they show conclusively that "even the poor were better off under the existing system than they would be under any other", there were additional and more personal delights Economics became a Real Science Not just a sort of "social science" like sociology or politics, but Real Science Of course one had to admit, with that Modesty which so becomes the Scientist and Gentleman, that Economics, the Science of Scarce Goods, was "purely formal in character", one had to disclaim any capacity of being able to judge "ends", one had to restrict oneself, as an economist, to judge between "economical and uneconomical ways of achieving given ends" But what wonderful reward accrued to the modest! "Economic Laws" described "Inevitable Implications" Indeed, one became as good as a Mathematician (even though one operated with rather

primitive equations) Only those who know the sorrows of the despised "inexact" mental pursuits, the hankering after purity which characterises the intellectual snob, realise what the "System of Simultaneous Equations" determining "Economic Equilibrium" meant to the initiated When Diagrammatic Analysis was developed, joy was complete All impurity, all sordid politics, were left behind to be indulged in by mere laymen

This did not, of course, prevent one from descending from Olympus from time to time, to be interviewed or even to contribute some articles to the popular press on burning practical questions But one had the feeling of doing it, so to speak, unofficially One could, of course, by subtle illustrations, indicate what one thought of the "desirability of individual liberty, absence of regimentation, power of continuous initiative" (without in detail indicating whose individual liberty, whose continuous initiative—e.g. of an unemployed miner—one was talking about) One could, of course, argue that any planning was impossible, for only in an economy possessing free markets could the comparative merit of goods to be produced and of the methods of production be determined One could voice very definite views on matters of urgent political concern on the basis of these formal deductions without investigating whether the basic assumptions were at all applicable to the situation on which advice was pronounced, whether the whole body of doctrine was not in itself contradictory There remained, alas, an "*unexplained residue*" (my italics) "provided by those fluctuations of trade which have come to be known as the trade cycle Pure equilibrium theory does not explain discrepancies between total supply and total demand in the sense in which these terms are used in the celebrated Law of Markets" It proved to be for the Orthodox School a somewhat awkward "residue"

This was the sort of economics which ruled supreme, at any rate in Britain, during and after the last war Its practical consequences were momentous Not only was the accepted doctrine generally agreeable to civil servants, who effectively, if not in name, controlled policy But they had a much more pressing reason to embrace the classical faith If the Economic Law pre-determined everything, if, in accordance with the Gold Standard, booms and slumps followed each other by Higher Decree, the civil servant was free from direct responsibility No questions

can be asked by troublesome M P s about the "Inscrutable Will" Indeed, crises assumed the role of curing inefficiency, of being the retribution for the "self indulgence" of the "people" Provided the most vociferous vested interests capable of making trouble were placated in the field of each Department, the rest could be silenced by the assurance that nothing positive could be done against Destiny

But so long as economic evolution was unbroken and changes were continuous and thus at any one moment imperceptible, the dominance of Orthodoxy could hardly be challenged Fluctuations and crises did occur, but they were, on the whole (at any rate after 1848 and the Californian gold discoveries) an interlude in an unbroken and astonishing expansion and progress They could by the complacent still be called "unexplained residues" Besides, there was no experience of how any different system would work

The whole trend of economic reconstruction after the last war was towards what was considered "normal", i.e. pre war conditions This happened in spite of the experience gained which showed clearly that any rapid re-organisation of the economic system necessitated by a violent change in demand (such as both mobilisation and demobilisation), cannot be accomplished by *laissez faire* methods without causing permanent grave maladjustments in the productive and financial structure which subsequently generate self perpetuating harmful fluctuations in economic activity The muddles of officialdom, the obvious shortcomings of such war-time controls as had been instituted, the pressure of vested interests who saw a possibility of rapid profits, their success in identifying controls with the destructiveness and waste and misery of war, were the factors which decided the issue Mr Churchill, who in 1919 expressed himself "very nearly convinced" of the practicability of State Control, became the Anti Socialist Candidate of 1923 The partisans of enlightened social controls had no chance Mr Keynes was regarded as a "clever" critic to be distrusted Labour Governments were even more under the influence of orthodoxy than Chamberlain or Churchill

Nor was the international vista different The peace treaties were basically framed on pre war conceptions only superficially modified by the experiences of the war They accepted the unrestricted sovereignty of individual states as the basis of international economic relations It was obviously assumed that the

states would of their own commonsense and volition agree on some limitation of their sovereignty and freely co operate with one another in promoting common prosperity The revival of the old squabbles between the Allies as soon as the most immediate threat by Germany was overcome should have warned the framers of the illusory nature of this hope .

The international executive organs created during the war, which, perhaps, might have been effective, were smashed A sop had to be given to public opinion The League of Nations Council was equipped with a Financial and Economic Sub Committee and furnished with a special Secretariat No provision was made, however, to enforce the decisions of this organ, even if its constitution and the unanimity rule had permitted any clear-cut decisions to be reached There was created furthermore an International Labour Office on the basis of representation of the three parties concerned with Labour relations the governments, the employers and the workers

This experiment in international "co operation" has (except for some slight partial successes, which have been boosted far beyond their desert) dismally failed The so called reconstruction schemes proved to have been based on the quicksands of inflationary international lending On the first occasion when they were tested, i.e. in the great world depression (to whose severity they even contributed to a considerable extent), it was found that in practice the much-hoped-for co-operation did not materialise There was an unbroken increase in national exclusiveness both in the sphere of the exchange of commodities and with respect to human migration The efforts to secure a lowering of tariff walls, and the abandonment of other, more extreme, forms of protection did not succeed The pressure of vested interests within each sovereign state was far too great to be resisted by mere general goodwill Without a conscious and planned effort full employment could not be maintained Without full employment imports became a factor of deflation and unsettlement to be resisted at all costs

This indeed is the true explanation of the failure of reparations Had there been planning on an international scale Germany could easily have paid Russia after this war could, without fear for her economic well-being, insist on Germany rebuilding the shattered industry of Kharkov and Stalingrad and all the other ruined cities It was individualism that failed, not reparations

Lord Keynes' teaching, inapplicable to a sensibly working economic system will have so much taken root that, at the next peace-making, reparations will, wrongly, hardly be insisted upon by the Western Allies

The position of Britain was the most precarious. Dominated by Sir R. Horne and Sir E. Geddes, the return to "normality" was enforced by the Tories on Mr. Lloyd George, who, after the unholy election of 1918 came to depend on them. In the revolt of the backwoodsmen in 1922 Orthodoxy celebrated its greatest triumph. It was able in 1924 to dispose of an incompetent Labour Government by the second post war election trick, the Zinovieff letter.

Then Sir Otto Niemeyer and Mr. Montagu Norman journeyed to Washington to push the unfortunate Mr. Baldwin into a debt-settlement with the United States which could only be honoured provided the U.S. re-lent the money or inflated, and neither could have offered a permanent solution. Back we went to the gold standard. Sterling looked the dollar proudly in the face. That the existing wages were far too high at the pre-war parity was a minor matter to be overcome, presumably by the Law of Supply and Demand. The need for cutting money wages in order to regain international equilibrium led to a general strike. It failed. But a general lowering of the wage-level was never again attempted. The country, uneasily perched on its shaky parity, borrowed at short term from abroad, whilst keeping up appearances as a "world financial centre" by lending to weak debtors. But it was when the artificial position thus created ended in the 1929 crash that the orthodox orgy really began.

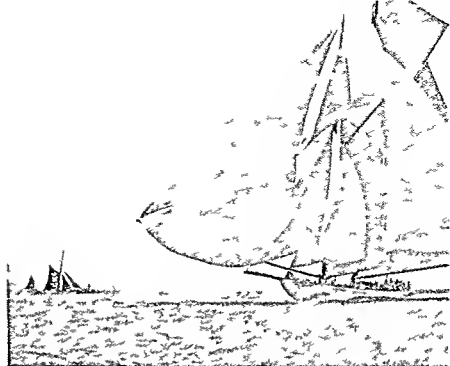
Sir Otto journeyed—with and without tame economists—to the four corners of the globe to preach and enforce the gold standard. Wherever he went and his advice was taken affairs collapsed—Hungary, Brazil, Estonia. In those countries which could somehow extricate themselves from his influence—Portugal, Australia, and Estonia at a later stage—the crisis was weathered without extreme catastrophe. At home the May report pushed the country into a violent crisis. The economists predicted national bankruptcy—the prospective deficit was a paltry £70 millions. The panic created was accentuated by the prognostications of woe by those who regarded the depreciation of sterling as equivalent to an inflation on the German scale. But off we went—in spite of all efforts. The bogey of inflation, the worthless German mark



'The remuneration of all', according to classical theory, 'was strictly in accordance with their contributions to the effort to procure the material ingredients of human happiness'

notes deftly handled by reactionary politicians, provided the election trick to secure a Tory majority for a third time.

Of course nothing of the sort happened. Prices tumbled further and Britain had to undergo the painful and wholly unnecessary flagellation inflicted on the body economic by Mr. Chamberlain. Yet to our Orthodox school of economists even the penance suffered—mainly by the unemployed and elementary school teachers—was not sufficient. When the Treasury belatedly inaugurated a timid easy money policy for purely fiscal reasons (still very austere refusing to embark on public works or to permit private business to make use of it for new investment) they uttered heart-breaking wails about the horrible consequences of such despicably inflationary measures. But British recovery proceeded, even though at the cost of seriously aggravating the international economic position by the simultaneous effect of depreciation, wage-cutting, and of the imposition of tariffs in Britain and of the increase of the protective walls in the Empire on imports from foreign countries and depressing their economic activity. When at last cheap food and cheap money began to revive business in Britain it was too late. Hitler had crept into power. It would be unjust to blame British policy for that



'Satisfaction and happiness are strictly private sensations But it is not true that a poor and a rich man will derive the same satisfaction from receiving an additional £1

melancholy event, though it contributed its share to a renewed catastrophe in Europe

In France and Germany, unfortunately, orthodoxy was even more successful France maintained, under the intellectual dictatorship of the "Liberal", Professor Rist (who sat on the Boards of Directors of all the main monopolies of that unfortunate country), an insane but strenuous fight against economic recovery until 1936, the year of the reoccupation of the Rhineland The emaciated country, torn by depression and confidence crises, could not pursue an effective policy towards Germany when there was still time—the cost of mobilisation might have upset the Budget and the Gold Standard When finally Blum was thrust into power by the disgust of the masses with crypto fascists such as Laval and Flandin, the incubus of orthodoxy prevented effective action until it was too late Daladier and reaction triumphed and the body politic rotted The unholy triumvirate of the General Staff, Gamelin, Giraud and Georges, prevented modern training, modern battle formations and to some extent modern armaments, even such as could have been wrung out of a reluctant Treasury There were no airplanes Tanks were scattered in small groups De Gaulle's warnings were suppressed

In Germany too, the "Liberals" led the *danse macabre* of democ-

racy They were forced by the crisis to decree a general moratorium on foreign debt in 1931 But they did not use the opportunity given by the introduction of exchange control to alleviate the appalling suffering of the mass of German workers They did not permit an adjustment of the value of the mark to the lower level necessitated by the depreciation of the pound—in their view that would have been inflation Nor did they undertake public works to ameliorate the position Wages and salaries, pensions and unemployment benefits were cut until 6-7 million breadwinners were thrown on the dustheap with no hope in their hearts and the whole of the younger generation thrust into despair The curve of Hitler's popularity rose at the same appalling rate Finally the dirty scandal threatening over the subsidies granted to East Prussian landowners (including Hindenburg's son) made the culprits hand over power to the Nazis

THE KEYNESIAN REVOLUTION

Whatever may be our judgment about the real progress achieved by the masses during the last century, whatever importance we attach to the growing imperialist pressure for new markets (including protected internal markets) in the ultimate causation of the First German War, whatever our opinion on the ultimate moral basis and aims of society as it evolved in the last century, there can be no doubt that the conquest of the universe by science and industry furnished a background favourable to optimistic economic views But no doctrine, however well established, comfortable, elevated, and scientific, could survive a storm in which its analysis, its diagnosis and its therapy proved wrong, futile and vain

Mr Keynes and others in Cambridge began to question the implicit assumption of the pure theory that all supply immediately and automatically creates an equivalent demand People began to wonder what would happen if Savings were not immediately and without any friction balanced by Investment in Capital Goods For some time "Pure Theory" was left severely alone But Mr Keynes' activities were threatening the whole structure Any minute he could generalise his specifically monetary theory and threaten the whole Equilibrium And there was manifestly nobody who could argue with him without being mauled by his mordant wit and unsurpassed dialectical ability The attempt to explain monetary disturbances as a

"residue", whilst leaving the main body of the theory intact, led, to some extent owing to the intransigence of the upholders of deflation and Equilibrium, to a questioning of the very basis of the orthodox doctrine itself

The essence of the Keynesian Revolution was the denial of the basic assumption of classical economics that individualist capitalism possesses an automatic mechanism which brings about "Equilibrium", i.e. full employment, and ensures inevitable progress. Saving and investment as we understand them in everyday life, i.e. planned savings and planned investment, being governed by a different set of factors, do not balance automatically. Indeed, it is most likely that in rich countries planned investment will lag behind, since savings increase with income, and investment is held in check by the exhaustion of outlets and by the impossibility of depressing the rate of interest sufficiently.

This was a revolutionary change of outlook in economic analysis. Instead of assuming full employment and trying to determine the causes of the recurring "abnormal" and "residual" problem of economic fluctuations, Keynes built up a new view of the economic system. Full employment was not a postulate in his theory, but a situation which occurs only when certain independent factors move into a favourable constellation. The progress in the last century thus seems to be an historical accident, which is not only not certain, but is rather unlikely to recur. It was due to the constantly opening opportunities for profitable investment caused by technical discoveries (e.g. railroads, steamships), by the rapid growth of population and the lack of organisation of the workers taken advantage of by an energetic entrepreneurial class in the West.

Yet, however revolutionary, the Keynesian view of the working of the existing economic system is still basically optimistic and politically "conservative". The threat of enforced idleness and misery could, if this theory is right, easily be removed and without any fundamental alteration of the individualist capitalist system. All that is needed is to recognise our previous folly, to see through the humbug of finance, and the trick is done. Once we discover the need for monetary management and the difference between the National Debt and debts incurred by private people, the magic will work and we shall enter the New Era.

Apart from Victorian officials of the Treasury and the Bank of England, this doctrine was welcome to the "upper"-class public.

It provided the long-sought after explanation of our ills and suggested that they could be cured without disagreeable or basic changes in our social system. Indeed, whenever full employment is attained, as in wartime, the chasm between Lord Keynes and his classical antagonists immediately vanishes. This has been amply demonstrated by his celebrated broadcasts and writings since the beginning of the war. Not for him the irksome restriction on personal "liberty" implied by the "Prussian" method of rationing, not for him the widespread bureaucratic controls over every phase of economic life. War economics means for him (at least as far as his published work is concerned) nothing more than the problem of inflation, the filling of the "gap."

It is not very astonishing, then, that this kind of New Economics should have been eagerly accepted, especially in the United States. The Americans have, in the last decade or so, suffered very badly from unemployment. At the same time the vastness of their natural resources and the technical efficiency of their industrial organisation are such as to support hopes that partial reforms can vouchsafe a tolerable standard of life. Their historical background, based on an open frontier and limitless opportunities for individual initiative, tends to prevent the spread of intellectual sophistication, however eminent some of their scientists. The true blue economists, of course, hold out for their Equilibrium and curse Mr. Roosevelt. But even the "reckless reformers", the upholders and advisers of the New Deal, such as Professor Hansen, seem confident that once the troublesome Devil of Financial Orthodoxy has been eliminated, all will be well in a world blessed by Mr. Cordell Hull, Big Business and the Atlantic Charter. In a pamphlet written for the National Resources Planning Board, a defunct Government agency, he states boldly

"We must deliberately set out to hold the new income level and to push it higher as rapidly as increasing productivity will permit. We do not want the Government to run the whole show. We do not want a totalitarian state. We want freedom of enterprise. We want freedom for collective bargaining between employers and employees. We want freedom for co-operative action. We want freedom of choice of occupation.

If purchasing power is maintained at a high level, we need have no fears that private manufacturers, retailers, wholesalers, and farmers will not come forward and supply the market with the goods demanded by the public—a rich variety of goods at reason-

able prices. Private business can and will do the job of production. It is the responsibility of Government to do its part to insure a sustained demand."

Yet somehow this ingenuous ingenuity does not sound quite convincing. First of all it wholly disregards the basically political complexity of the problem. Even if the Keynesian analysis of our ills were correct economically, it is a very far cry to its being applied in practice. If nothing else, the increased responsibility thrust on the Treasury would be a permanent threat to its success. It will, moreover, be extremely difficult to convince "average business men" that a hefty and almost perpetual budget deficit is "all right". It was, I think, Mr. Churchill who so very brilliantly characterised the fundamental difference between the general attitude to the economic problem in war and in peace. by saying that on the morning of 11 November 1918 production was limited only by the physical capacity of the country; after 11 a.m. the money cost automatically reasserted its sway.

Now Lord Keynes is acclaimed as spiritual leader in matters economic because his policy, the deficit having been enforced by the war, wholly coincides with that of his erstwhile adversaries (and is equally insufficient for full war economic mobilisation). It is to be doubted, however, whether the "confidence" of the business-man can be won by his precepts. It is to be doubted whether he will still be the hero and representative of the City after the war. It is equally to be doubted whether Mr. Roosevelt will be able to keep his Party in power when victory comes, and whether even the Democratic success at the polls in 1944 will mean a domination of the U.S. scene by the progressives. Indeed, Sir Kingsley Wood was already hankering after the next Armistice when, no longer tutored by Lord Keynes, he could finally discard "the specious argument" "that because we are now spending some £12,000,000 a day on the war it should somehow or other be easy now or after the war to find more millions for one or other beneficent purpose". (House of Commons, 9 September 1942.) The Beveridge Scheme is opposed because it would transcend our ability to "pay". Fears about exports are the chief bogey. But full employment at home with effective planning of foreign trade provides the solution of the economic problem.

This is not all. Apart from the intellectual and political difficulties there are economic reasons why, without some basic reforms,

the success of "global monetary" intervention will prove insufficient to assure full progress

It is not quite as easy as some people now seem to imagine to find innocuous outlets for capital investment by the State. As long as the State merely arranges the normal public investment, such as roads, railways, etc., so as to offset the fluctuations in private investment, all is well. But the impression on the business cycle which variations in these investments can make is at the best not very considerable.

Where are we to look for further outlets for public expenditure? It would, of course, always be possible to restrict ourselves to creating consumption incomes by subsidising consumption directly, e.g. paying substantial unemployment benefits financed by Government borrowing without increasing insurance contributions or taxation. It would be possible to dig holes and fill them up again. But this is exactly the sort of method of creating a deficit which is bound to arouse most antagonism and panic among investors and entrepreneurs as there will be "nothing to show" for the increased debt. And indeed, though full employment by direct stimulus to consumption is preferable on all counts to unemployment, the progress of nations who can organise full employment by useful capital investment will in the longer run be more secure and quicker than that of countries which cannot solve this problem. Should the State build houses or invest in industries needing massive plant such as public utility undertakings? But what will then happen to the existing investments and firms? Will they go on with their activity? The Government public works programme could be helpful only if it did not compete with existing private assets. The reaction of the electricity industry in the U.S.A. to the T.V.A. showed clearly that any Government scheme, if it implies a threat to private capital, will inevitably result in a fall in private investment. Of course, such a fall could again be offset by a further increase in the State financed investment or deficit. But is it not bound to evoke a further confidence crisis and so open a vicious circle? "Personally", wrote Professor Robbins, "I can conceive few policies more likely to lead to a serious breakdown in confidence" (letter to the *Economist* in 1932). If, however, the export of capital is permitted, there is no limit to the "strike" of capital. As the example of France in 1936-7 showed, a deficit which is above the normal rate of saving could easily be drowned by the flight

of capital abroad. It is significant that *all* plans emanating from industrial (F.B.I. ; the 120 industrialists and Lever Brothers) or Conservative (Lord Salisbury) quarters insist on a rigid limitation of the scope of investment.

Even to reach full employment then, the Government must possess means of control which have been uniformly denounced by the U.S. Government and the "Liberals". Exchange control is the minimum requirement of planning for full employment. It is natural that the revolt led by Mr. Keynes, against the barren structure of orthodox economics, centred in the protest against the fundamentally false assumption of that doctrine: that the economic system tends automatically towards full employment and that unemployment is a residual problem of friction and "artificial interference" with an ideally working mechanism.

Unemployment was the most apparent, the most distressing evil which hestet us. But it certainly was not the only evil ; and it is by no means true that the Keynesian approach and diagnosis completely solves the problem of how to avoid the recurrence of unemployment once it has been abolished by a public works programme or some such methods.

THE PROBLEMS OF RECONSTRUCTION

The problems which a New Economics is called upon to solve are threefold :

- (1) The problem of stability of full employment ;
- (2) The problem of preventing exploitation of the community by monopolistic vested interests ;
- (3) The problem of the desirable distribution of the national product.

(1) FULL EMPLOYMENT

Full employment, or even a steady tendency towards it, is wholly incompatible with the functioning of the individualist capitalist system even in its corrupted form as it existed before 1939. Most people, including the experts of the U.S. Government (and perhaps even Lord Keynes), seem to envisage a future in which full employment is maintained by Government action, but in which economic decisions of individuals are left free. But as long as production is carried on at the initiative and risk of individual entrepreneurs, losses and unemployment play an essential rôle as balancing factors. If the State by its action eliminates these

balancing factors and does not substitute for them a conscious direct control of production and consumption (including a control of prices and wages), speculation will proceed untrammelled and monetary chaos is unavoidable. Without control over private investment (including investment in circulating capital, i.e. commodity stocks), an attempt to maintain full employment would result in a cumulative inflationary spiral. This is what happened in 1936-7.

It should by now be equally obvious that such controls without a control over man power cannot be maintained. The necessary shift, geographical and occupational, of workers could not be secured. And progress, especially progress in a community which is no longer expanding in numbers, is not possible without a fluid transfer of man power. Nor could a cumulative inflation through a rise in wages be avoided, even if speculative excesses were checked. Employers, moreover, would have no inducement to expand employment. They would feel their disciplinary powers vanishing as full employment was being reached and the threat of the sack carried no further terror. Their resistance would be strengthened by the hostility of the rentier and other classes with fixed incomes. The Trade Unions, on the other hand, will push their advantage while the going is good and prices are rising. Stability at full employment is incompatible with an uncontrolled, individualist economic system. Those who believe that they can cure the curse of unemployment by "expansionist" monetary policies, without any further reforms (as rank inflationism is now politely called), are grossly deceiving themselves and the public. The system which is likely to emerge, should the attempt be made to solve the post war problem by monetary means, is an alternation of attempts to gain full employment by "budgetary" methods, with periods when the recrudescence (consciously or subconsciously stimulated by the dissatisfaction with the "boom" of entrepreneurs and rentiers, powerful classes of the community controlling the best part of the press) of the "sound-money" fallacies of 1931 causes renewed slumps.

(2) MONOPOLISTIC VESTED INTERESTS

Secondly, the "Liberal" analysis of the economic system was based on the assumption that production was carried on by free competition between numerous entrepreneurs which implied that new entrepreneurs were able to enter any line of production freely whenever increased demand promised profits. They also assumed

that a fall of demand would eliminate redundant producers without general repercussions on business. These assumptions, even if correct when formulated in the nineteenth century, were certainly untrue as a general basis for the analysis of the economic structure after 1914-18.

In the first place technical progress had rendered mass production methods ever more productive. This put an end to "free entry" into industry as the capital resources required grew constantly greater and the risk of entering a battlefield on which industrial giants were contending grew with it. Those who are in the market instinctively refrain from all-out competition because they can increase their profits more by restricting sales. As the restraint originates in a "tacit" agreement it is impossible to prevent it.¹

Secondly, the products of firms, instead of being all of the same kind, as classical theory would have us believe, are increasingly differentiated by trade-marks, advertising, and so on. The increased differentiation of the product prevents the introduction or full exploitation of mass production methods. The widening retail and wholesale trade margin attracts a superfluity of people into distribution, further decreasing production.

Even more pernicious than the effect of these restraints on production, however, are the consequences of the direct combination of producers and traders to exploit the consumer. Under the guise of avoiding "cut throat" competition, "collaboration" or even "planning", trade associations are set up to "allocate markets" and "safeguard reasonable prices". In plain English, firms continue to thwart the interplay of supply and demand which commands the elimination of the inefficient. Combination is the natural reaction of producers to a shrinkage of demand. Where an industry is not pooled, the firms try to combine in order to avoid suicide. And since a wave of bankruptcy would endanger the financial stability of the whole economic system, the combination can always secure State aid in the form of tariffs and subsidies. Once a combination has been established the temptation to maintain inefficient units and use the power of monopoly to restrict expansion or to cut supply and thus reap "adequate remuneration" is overwhelming. As Mr. Kalecki and Professor Levy have shown, all indications point to the conclusion that free competition is the exception rather than the rule in present-day economic life.

This tendency is reinforced by the fact that Labour itself is increasingly organised in monopolistic associations, the Trade Unions. Trade Unionism grew up as a defensive organisation of workers against employers. Their policy was to concentrate mainly on the establishment of higher wages, shorter hours and more tolerable working conditions as well as to protect their monopolistic position. This protection took the form of agreements limiting output per man, limiting the employment on certain jobs to skilled men of a certain class and regulating entry into industry. All three measures are typically monopoly policies, i.e. they tend to increase the price (wage) by restricting supply below the optimum level. Any relaxation in these restrictions would, *ipso facto*, weaken the bargaining power of that section of labour which the Trade Union represents.

As they grew, Trade Unions developed a distinct bureaucracy, remunerated at a much higher level than the men they represented, any weakening of the sectional character of labour representation, therefore, whether or not it would have a favourable effect for the workers themselves, would have a distinctly adverse effect on the Trade Union officials. This may explain why, ever since the disastrous failure of the General Strike in 1926, the "co operation" between Trade Union leaders and their respective employers for a common exploitation of the community has increased. The Trade Unions represent the producer, not the consumer. The embarrassed silence of the Labour Party whenever an increase in the price of coal or other vital commodities is discussed is the direct consequence of this system, which received a strong impetus through the introduction of Protection in this country in 1931.

(3) DISTRIBUTION OF INCOME

Finally, the orthodox analysis of the Economic Mechanism is based on the postulate that economics cannot judge the Desirability of a given Distribution of Income. It is, of course, strictly speaking, true that the satisfaction which each additional income unit vouchsafes to its receiver is not comparable with the satisfaction it would give to somebody else. Satisfaction and happiness are strictly private sensations. But if they are not directly comparable, that does not permit us to assume, as most of these Purists implicitly do, whenever they apply their "strictly formal deductions" to actual problems, that the satisfactions are equal.

It is certainly not true that a poor and a rich man will derive the same satisfaction from receiving an additional £1

If, however, we assume that equality of income is a desirable goal for society, the problem before us becomes extremely difficult. The distribution of income has two aspects. It is, on the one hand, the distribution of the fruits of past productive effort. It is at the same time the mechanism by which production is regulated in an individualist economic system. Production is undertaken at the risk of entrepreneurs who hope to be able to reap a profit. In the same way wages and unemployment are a means of regulating the supply of man power. Of course, this mechanism, as far as labour is concerned, works inefficiently and slowly. Moreover, it depends for such efficacy as it has on the slavery of want and poverty and cannot work at all under full employment. If certain "Liberals" contrast the "freedom" of choice of occupations "enjoyed" under this system with the slavery of the planned economies, they think of their own middle-class freedom and not of the horror of dead-end occupations for juveniles thrown on the scrap heaps at eighteen by this "automatism of free markets" ¹

Profits are thus both the motive-power of enterprise and the mechanism by which the direction of production is ensured. Wages and unemployment are the means of compulsion by which this regulation is transmitted to the labour market. Any interference by the State in the distribution of income without appropriate remedial measures must, *ipso facto*, paralyse this mechanism. If a more equitable distribution of the national income is to be secured, if politicians demand that the motive of profit should be replaced by the motive of service, it is incumbent on them to show exactly what other mechanism they have in mind to induce and compel people to produce what is wanted by the community. Any measures, for instance, which encroach upon profits by taxation will reduce the willingness and ability for enterprise and risk bearing and thus create unemployment. The failure of the Front Populaire and of Mr. Roosevelt to achieve a steady recovery in spite of large deficits and public works programmes is a warning well worth heeding. Mr. Bevin, among others, expects that the war time extent of direct taxation can and will be maintained in peace, and that a better world can and will be achieved by that method. He is sadly mistaken, except under the hypothesis that

¹ Cf. "The Young Adult in South Wales", published by the University of Wales Press Board 1941 25

State expenditure will continue to represent a substantial proportion of total national income and that the State deficit will continue to absorb any surplus private savings. Unless the State itself will finance risky investment, there will be a constant danger of deflation. Under the individualist economic system private individuals must be bribed into investment by the prospect of large gains, and the inequality of incomes is necessary to induce sufficient savings. A planned economy can always outstrip an individualist system not merely because it can ensure full employment but because it can invest and save collectively and need not bribe the upper classes to do so.

Equally, an interference with the mechanism of wages and un-employment by, e.g., granting a dole not conditional on the willingness of the worker to undergo retraining and readjust himself, will also undermine the functioning of the individualist system. If for humanitarian reasons this indirect compulsion of want is abolished, it must be substituted by planning, public explanation and ultimately by direct compulsion.

Even if investment by individuals at their own risk is supplemented or even supplanted by planned investment by the State, economic incentives, i.e. the promise of higher incomes for greater or better contributions to the nation's effort remain necessary. But as risk is diminished or eliminated in a system planned and controlled consciously—as in war—the inequality of income will be restricted to the real difference in actual performance and not so much due to the inequality of the initial distribution of wealth. The ideals of equality of income and maximum progress will, as long as human beings remain mortal, continue to be in conflict. But the conflict can be narrowed and a better distribution of income can be secured once the profit motive—i.e. the venturing of private capital for investment not planned by the community—is increasingly replaced by a mixture of State finance and State control.

The automatic mechanism of perfect competition in free, world-wide markets is indeed dead. But it is perhaps not altogether superfluous to ask by what new system it is being replaced. Four obvious successors can already be discerned, some of which are surely rather more objectionable than individualistic capitalism.

- (a) restrictive monopoly capitalism: each section of industry striving to exploit the community to the utmost of its power which in its turn tries to snatch as big a share of the loot as possible: the Corporative State.

of Fascism such as Franco, Mussolini and Petain is but the logical product of the trend towards this solution,

- (b) planned economy which in turn can either be akin to National Socialism, i.e. planning—without rational ideology—imposed on *all* sections of the community from above (and, because lacking rational ideology, in all probability for the demonic aim of nationalist domination), or
- (c) Socialist planning which is conceivable only after a revolution has swept away the previous social structure (as in Russia)—and finally
- (d) a compromise solution between private enterprise and State control introduced on a democratic basis on the basis of modern economic principles in order to maximise output. This would depend on the free co-operation of all classes of the community willing to make sacrifices (at any rate from the immediate and sectional point of view) for the common aim of creating a juster and more dynamic (hence eventually also more prosperous) economic and social structure.

To sum up. The Economist must step down from his misguided isolation and tackle the problem of the interaction between social, political and economic forces. The defensive timidity which characterises our Employers and Labour Organisations, which resulted in our inability to tackle the problem of war mobilisation quickly, must be swept aside, and it can be swept aside only by those who have no vested interests to defend. If Lord Keynes has indeed begun a revolution, that revolution must continue much further if we are to win an inspiring peace.

THOMAS BALOGH

OUTLINE OF A PLAN

Summarised proposals for a progressive economic policy

Note—The editor, after reading Chapter 10, which says the revolution in economics must go further, asked Dr. Balogh for his constructive proposals, if possible to sketch them in the space of one chapter

We shall begin by discussing the professed aims of British economic policy after the war. We shall then attempt to survey the general background and enquire whether the prospective international position of the country has been fully taken into account by the partisans of the different schools of thought. Finally, we shall try to outline a *minimum* programme of reform necessary to safeguard the internal progress and the international position of the country. Given the historical background and the present social structure of Britain, any solution which could prove acceptable to a majority must be in the nature of a compromise. It might be argued that such a compromise is impracticable, not so much for intrinsic technical economic reasons but because of the inveterate opposition of the vested interests now in power. This may well prove to be the case. The failure will then result in a slow but steady deterioration in the international position of this country. In the end, some outside event or the fear of further deterioration will lead to a forcible solution either of the "Left" or of the "Right"—presumably of the "Right". But in discussing a rational approach to our problems this contingency must be disregarded. It is those who oppose a compromise, framed in keeping with British political traditions, who court the disaster of a violent and open internal struggle.

I THE AIMS

Most of the numberless blue-prints and proposals elaborated in recent months in this country show two peculiar characteristics: the first is an almost complete disregard for the international political setting in which Britain is likely to find herself at the end of

the war. This results in an unsatisfactory treatment of the international economic problem.¹ The second is the essentially negative nature of the ultimate ends of policy. All but a few agree that mass unemployment and destitution must not be tolerated again, but both the Employers' Associations and the Trade Unions take up what is an essentially identical, defensive-restrictionist attitude. The former wish to achieve their own security by compulsory cartellisation, price fixing, State subsidies and import and export quotas. The latter hope to enforce a restitution of pre-war trade practices (i.e. restraint on productivity and on the supply of labour), undo dilution, reaffirm the freedom of sectional wage bargaining and achieve security by an extension of social insurance and social services.

The working ideal is thus basically a static—hence in this changing world—a retrogressive economic system. Consequently when it comes to interpreting their basic aims positively and elaborating the means of achieving them, a growing disagreement between the different classes and political power groups can be discerned, which even exerts an unfavourable influence on the war effort. Progressives in general conceive the aim of economic policy as maximising current consumption by securing full employment and guaranteeing a national "minimum" to everyone. They argue that this determines the working of the system itself. To this end all reforms must ruthlessly be accomplished. The community as a whole, however, organised as a State, has, in their view, no ulterior tasks. The Conservatives in their turn would now seldom dispute this last thesis. They would only insist that the "effective demand", i.e. the distribution of the national income as it originates from the interplay of free market forces, must not be drastically modified, e.g. by taxation. Such interference beyond a certain point would be incompatible with the maintenance of the present economic system, and the Conservatives would argue that the maintenance of what they term "political liberty" (which their opponents would term "economic privilege") must take precedence over all other considerations. They would avoid the dilemma between the task of securing full employment and that of maintaining these "liberties" by a policy of public works which does not interfere with the profitability of private business and by a generous provision of relief, provided it is frankly regarded as relief.

¹ In most progressive plans this neglect finds its expression in an almost exclusive concentration on internal social reforms. The *laissez-faire* opponents of planning are thereby given a valuable handle in denigrating all reforms because of their ultimate unfavourable effects on exports.

If the Conservatives regard the task of eliminating unemployment as a means by which social discontent could be overcome, the Progressives envisage it solely as a means to increase the current consumption of the masses

Neither the usual "Conservative" nor the "Progressive" approach seems adequate. There can be no "purely economic" approach to the problem of post-war policy because the *ends* of that policy necessarily influence the choice.

First of all, the individual is inevitably also a member of a community and for the increased feeling of security which a closer fellowship offers him, for the esteem of his fellow-members, he is often willing to sacrifice much, often all.

Secondly, both the approach which regards the avoidance of social tension without basic reforms as its main task, and the point of view which limits its horizon to the elimination of privilege and the increase in the standard of life in this country, disregard the fact that British policy must be determined with due consideration to the international setting in which these policies are to be implemented. However complete the victory of the United Nations, it would be folly to assume that such a victory will for ever secure international political stability without continuous positive action. The social and economic systems of the main Allied countries are divergent, and the possible differences between them numerous, not least in economic affairs. Proposals which disregard the first necessity of securing Britain's influence in the world, and at the same time of securing that this influence will be exerted in the right direction, must come to grief.

In this chapter the view is put forward that this country has, at any rate to a large extent, lost her freedom of choice. Britain's future international position, even under the most favourable hypothesis, imperatively calls for an economic solution far more "collectivist" in character than most people, either on the Right or on the Left, are willing to contemplate. Her world power before the last war (and even more in the nineteenth century) was based on several factors, all of which have disappeared, or have at least been weakened, since 1914. It was based, first of all, on a fast growing population which in absolute numbers was of the same order of magnitude as that of most other big powers. It was based, secondly, on the high productivity of her industries which had enjoyed a considerable start over those of all other countries. This advantage had secured her a privileged position among the

exporting nations. Last, but not least, it was based on her favourable strategic position, which rendered her militarily invulnerable as long as her battle fleet secured the control over the sea routes, and which placed her economically in the centre of the main trade routes between industrial and primary producing countries. There existed no first-class powers outside the Continent of Europe. And on the Continent England nearly always¹ succeeded in maintaining the balance of power by suitable alliances. Unless post-war differences between the victors lead to a renewed resurgence of Germany and Japan, only two basically powerful protagonists will remain in world affairs, the U.S.A. and the U.S.S.R. Britain and China, without thorough reforms, will—though for almost diametrically opposite reasons—have to be content to play a secondary rôle. Not unless China can effectively industrialise herself could she rise from that position. Britain, on the other hand, must broaden her economic and manpower base considerably if there is to be any hope of her being able to play an active part in shaping world affairs.

The U.S.A. constitute a vast continent, self-supporting except for a few raw materials, and likely to be even more self-supporting in consequence of this war. Their self-sufficiency is, in the main, due to the bountiful natural wealth of the continent. Even if the economic system remains unreformed and beset with instability and unemployment, the national income of the U.S.A. will be so high as to result in voluntary savings at the annual rate of between £3,000 to £4,500 millions. If unemployment is to be reduced to a tolerable level, a large portion of this, perhaps as much as £500 million, probably even more, will have to be invested abroad, as the intensification of home investment by the Government would raise insuperable political problems.

Russia, though poor in terms of the standard of life of the Western powers, has, in the last fifteen years, made the most startling economic progress of any nation at any time, based on her vast and still largely unknown natural resources. She has succeeded in building up an industrial structure within the last ten years, strong enough to contain the attack of a war machine based on the whole of the industrial wealth and skill of a forcibly united Europe. She has been more weakened by the war than the Western Powers. Her economic system, however, enables her to enforce savings and undertake investment, i.e. develop her

¹ On the one occasion when she had to fight a coalition the loss of the American Empire was the consequence.

economic strength, on a scale which in individualist societies would be impracticable. If this system were to be devoted to increasing the standard of life of the mass of the people it would inevitably attract the population of most European countries which, because of their poverty and relatively small size, could not bear the burden of such a rate of progress without grave hardship on a considerable part of their population. At the same time, the economic war potential of the country would rise *pari passu*. Not without reason did Hitler invade Russia in 1941 instead of reducing Africa and the Middle East.

Sandwiched between these extremely powerful economic giants, Britain in isolation would inevitably feel herself on an uneasy perch. With the elimination of the Axis a strictly European balance of power would completely lose all meaning. It will automatically be replaced by a world balance of power. The Commonwealth could not, in the long run, maintain herself in isolation unless a stable peace system could be secured. But the weakness of Britain would render the emergence of such a system improbable.

Britain could, of course, renounce all pretensions to being a world power and endeavour to concentrate on the arts of peace. A position similar to that, for example, of Denmark or Holland before the war has many advantages. Such a policy, however, could not be envisaged by the protagonists of the Right, and certainly not by the Prime Minister, who flatly declared that he does not intend to preside over the liquidation of the Empire. But the critics of the Churchillian attitude on the Left would also do well to reflect upon the implications of the alternative, not only for this country but for the world as a whole. If, indeed, a complete world union could be accomplished which permitted economic and social planning on a world-wide scale, and which once and for all secured peace, the task of national states or regional Unions could be confined to carrying out any necessary internal reforms. Such a state of affairs would imply a complete renunciation of political and economic sovereignty, and the willingness of different parts of the globe to submit to policies which would tend to bring them at a calculated pace into equality with one another, even without being bound by special ties. This assumption is not at present very realistic.

Thus the concept of a world balance of power retains its relevance even after the Nazi ambitions for racial or national domination

have been crushed. It is the key to the freedom for internal political action for a single country or regional Block, untrammelled by any other Power, i.e. to the pursuit of progressive economic and social policies over a wide enough area to permit economically effective action.

In my view, Britain could achieve such freedom of action only if she succeeded in unifying Western Europe (with due regard to the legitimate desire of the U.S.S.R. for security) and in establishing an economic and social system which could command the enthusiastic support of all. Effective economic planning, securing full and efficient employment, established over this area and its connected empire would create an economic system, large enough to permit intensive economic development, and strong enough to resist unjustified economic interference. The organisation of such a union would inevitably entail some sacrifice on the part of Britain, which undoubtedly possesses the highest standard of life, i.e. the best means to help in the development of others. Yet this sacrifice would be more than justified in its fruits, by preserving the possibility of the continuance of the traditional development of this country.

Even if Nazism is smashed there will remain fundamentally divergent aims in the social and economic systems of the main Allied countries. Britain, in these circumstances, would exert a valuable and effective influence only if her mediation were backed by economic strength. Otherwise Britain would lose her freedom to evolve a specific solution of her post-war problems, in keeping with her history and established traditions and she would be forced by the need for securing foreign help to accommodate herself to the wishes of what might be quite frankly called a protecting power, in all likelihood the U.S.A. If in the United States a political system of tolerant and progressive reform were firmly established, there would perhaps be little cause for alarm. Unfortunately, it is even less likely that the cause of progress will prosper in that country than in Britain. The complexity of the United States Constitution does not encourage much hope. It was created to resist change rather than to accomplish it smoothly.

The Nazi tornado, like the last war, has for the moment obscured the strength of the centrifugal forces in Europe, the bitter internecine hatreds which have twice helped Germany almost to achieve world domination. The ideal of a close European union has been compromised because of the repugnant aims and more

repugnant motives with which it was forcibly accomplished by the Nazis. Yet if, after the war, the economic union of Europe, at least of Western Europe (which also implies close political union), is not accomplished, no stable political and economic system can be built. Continued reliance on the balance of power in Europe and a renewed backing of reactionary elements in each of the constituent units of that divided Europe, must bear bitter fruits.

The union of Europe will be accomplished either by Britain or against Britain. It will be accomplished somehow, because it is only the reactionary privileged classes who oppose it, and those classes, as we have seen in Spain, Italy, Poland and Hungary, cannot create strong economic systems, because strength demands planned economic development over wide areas. In the meantime, Britain's strength outside the European Continent would decline, because she would be forced to expend her energies in the attempt to protect the European *status quo*.

In default of a progressive Western European Union under British leadership, the result is likely to be either a unification of Europe by Russia or, if the Anglo-Saxon countries use a temporary weakness of Russia to try to exclude her from Europe, a renaissance of the policy of Russo-German collaboration, into which Russia and Germany were driven after the last war and which was only ended by Hitler's mania. Such a Russo-German combination would possess overwhelming force.

Britain excluded from, and at the same time menaced by, a unified Europe would inevitably drift into being a client state of the U.S.A. But neither the problems, the background nor the social development of the two countries is sufficiently similar to produce harmony.¹ Some of the privileged classes in Britain—like the Protestant landowners of Ireland—might not find this dependence unpleasing, but to the community as a whole it would be disastrous.

The British Empire, serving as a basis for a wider Western European Federation, regenerated by the war, and reformed in its political, economic and social content, could contribute much to the emergence of a new and better world. A waning of British influence, indeed, under the conditions which are likely to obtain after the end of the war, would probably lead, not to harmony and progress, but to renewed catastrophe. There are no competitors

¹ Cf. Agar, "The Time for Greatness", which shows the basic difference in the approach even of progressive Americans.

for a progressive leadership of the scattered areas in which British influence now prevails. Britain could, moreover, provide the compromise solution and thus the link between the divergent economic and social systems of the United Nations, when they are no longer united by the imminent threat of Nazi domination.

But all hopes for such an increase in Britain's international influence must disappear if Britain remains internally and externally the protagonist of the *status quo*. *A renaissance in Britain is the condition of a renaissance in the world at large*; and a British failure would mean more than merely the decline of the Empire. These considerations indicate that an essential condition for the emergence of a more stable world order is that Britain should stand at the head of a progressive Western European Union, strong enough to be an equal partner with the United States and Russia. Only such a strong and progressive economic *bloc* can play the rôle of a mediator and actively pursue a middle course between the divergent social and economic systems in the United States and Russia.

If, however, Britain has not only to undertake her own reconstruction, but at the same time to take a leading hand in the re-settlement of Europe and the transformation of the Empire into a Commonwealth, then the extent of her post-war economic problem will be a formidable one.

Under no conceivable conditions, however fully and efficiently Britain's available resources are engaged, can she hope to overtake or parallel American national income. Even to raise her investment capacity to the necessary level would involve abandonment of an economic system in which the rate of economic progress is determined by voluntary decisions of individuals as individuals and not acting collectively. In order to sustain the effort required, not only must Britain's economic potential be fully employed; not only must she ruthlessly eradicate technical inefficiency which hampered her production before the war and reduced her output per head far below that of the United States, but radical changes must be made in order to canalise this effort in directions (i.e. increased investment) which are necessary to guarantee national survival in unfavourable circumstances.

II THE MEANS

The achievement of these tasks under the *laissez-faire* automatic system of individualistic enterprise is impossible. Planning in the sense of a continuous and conscious collective determination of

the economic activities of the community as a whole, directing, stimulating and controlling the efforts of individuals, is essential. The problem remains of how to resolve the dilemma between conscious planning, with the necessary compulsion to put the plans into effect, and the freedom of the individual which must be preserved.

In discussing the means to be adopted, compatible with the maintenance of a politically free democracy, two important considerations have to be borne in mind.

First, the fact is often ignored that the individualist capitalist system does not work without compulsion. The price and cost relationships which emerge from the market mechanism force employers by bankruptcy and workers by unemployment to undertake changes to which they would otherwise not submit. It is the whip of destitution which enforces the direction of production according to demand.

Secondly, it must be borne in mind that full employment, even in a true sense of the word, need not entail such regimentation, especially over man power, as has been evolved in Russia, Germany, and latterly even in this country by the impetus of the rearmament programme. The maximum physical effort will not be the sole aim set before the country in peace, there is no need to contemplate the continuation of the present superhuman effort. The leisure of the population is, within certain limits, one of the main aims of Government policy. If working hours can be kept at levels below physical maximum (i.e. roughly at 7-8 hours a day) this in itself can provide the reserves for any temporary spurt required by economic emergencies, it would provide the flexibility necessary to remove bottlenecks. But new sanctions will be needed to obtain labour mobility and efficiency as well as smooth adaptation by managements once the threat of unemployment and destitution has been removed.

Both workers and employers will have to rely on *political* rather than economic safeguards to obtain *economic* security. *An economic system which is not consciously planned in the interests of all its members, must tend towards sectional monopolism and thus to retrogression.* For in such a system it is scarcity and not full effort which secures high remuneration. This basic stumbling block in the way of progress can be removed only if both employers and workers are confident that the economic disarmament of either will not be followed by aggression on the part of the other, just as in international affairs.

disarmament is not possible unless some supernational authority is firmly established. Such confidence can be secured only if workers are made full partners in a system of conscious planning and direct control.

Provided full co-operation can be obtained from both sides, private enterprise need not be eliminated in fields where it can contribute its share. Indeed, it should be stimulated. The reform of the present system suggested by Britain's post-war problems would by no means be wholly unfavourable to 'business'. Increased stability and collective sharing of inevitable burdens would undoubtedly lighten the business man's lot, just as it ensures better conditions to workers. Once an economic system can be energised to full effort, the resulting increase in production is so vast as to benefit all, at the same time as making possible the abolition of injustice to the weakest.

Where are the sources of new strength which can be tapped for the tasks which seem beyond our capacity?

Britain, in this as in the last war, has succeeded in achieving an effort which orthodox economists, within and without the Government, on both occasions quite openly declared impossible. Millions of men and women were withdrawn from productive employment, between 40 per cent and 50 per cent of the remainder was devoted to the war effort. Yet, even if we exclude the consumption of capital and loans from abroad (including Lend Lease) as temporary means of support, she succeeded in maintaining the standard of life of her population on levels distinctly higher than those to which it had fallen during the great depression. She succeeded in doing so only partly by establishing full employment in the true sense of the word.

Through a reduction of the level of unemployment to about 300,000 in contrast to that of almost two millions even in the most prosperous years before the war, and of some 1-1½ millions, which might be expected, in the best circumstances without reforms after the war, an additional national production of £250-£350 millions per annum (at 1938 prices) could be gained. To this has to be added an unknown number, mainly women, perhaps as much as half a million, who would in these circumstances be eager to stay in gainful employment other than domestic service. This would mean a further addition of some £100-£150 millions per annum. However important, this factor accounted for only a part, prob-

ably a smaller part, of the expansion and the tremendous vigour of the war effort

A far more important source of latent productive power could be derived from the elimination of unnecessary services and of inefficient excess capacity which were consequences of long years of monopolistic restrictions. It would not be too optimistic to assume that national real income could be increased by the abolition of waste in industry and distribution to the extent of 25 to 30 per cent. This might mean a further gain of the order of magnitude of between £500 and £1,000 millions or more per annum in national real income at pre war prices. The abolition of restraints on progress would also substantially accelerate the yearly increase in productivity.

These figures demonstrate that once the problem of achieving a balanced progressive economy after the war has been solved by employing the available productive resources fully and efficiently and by solving the foreign trade problem, the economic basis for a complete solution of our internal social and international political problems could be provided.

The reforms which seem to be necessary constitute an *inter dependent whole*. No step can be taken singly. Each of the measures determines the political acceptability of the rest. In all plans which attempt to preserve the existing political and economic system, based on the rights of the individual, the willing co-operation of all classes of the community must be secured.

The co-operation of all can only be secured if each side abandons its defensive attitude, originating partly in mutual suspicion and partly in economic insecurity which holds them in its grip and makes a generous departure difficult, if not impossible. A new *total* solution is required. Sectional reforms will not help and in paralysing the existing machinery, they might even do harm.

III SUMMARY OF RECOMMENDATIONS

Within the limits of space allotted to me by the Editor I cannot here do more than give a precis of the steps that, in my opinion would take this country on the right path. I have tried, however, in the following summary to set out the ideas sufficiently clearly for the reader to understand my recommendations even though the argument is not developed in detail.¹

¹ Cf. *Economic Foundation of Britain's International Future* Kegan Paul 1943

I. POLICY

(I) FULL EMPLOYMENT MUST BE STABILISED BY

A The State maintaining the level of money income

(a) *By maintaining consumption by*

- (1) the provision of social security appropriately financed
- (2) the elimination of monopolies
- (3) the reduction of indirect taxation which falls heavily on the consumption of the poor
- (4) the provision of necessary social services
- (5) subsidising the consumption of commodities and services (including housing), the lack of which affects productivity and which are not sufficiently widely consumed under the existing distribution of incomes

(b) *By stimulating investment*

- (1) by its own public works policy, especially also in the colonies, and by helping destroyed areas.
- (2) by the investment policy of industries directly controlled
- (3) by stimulating private investment through tax reforms and the provision of capital for new businesses, business extensions and capital projects

The State will have to establish a Capital Budget, to render investment policy effective, financed by loans and/or by taxation ¹

B Preventing an inflationary spiral, resulting from the policy of full employment

(a) *By a national wage policy and compulsory arbitration*

(b) *By control over private investment (and prices, cf. below under II (A))*

Capital investment should be met by taxation if consumption threatens to rise as a result of these measures beyond the desired level. The provision of a decent and increasing minimum standard of life for all must be considered as the first charge on the national income

(II) THE EFFICIENCY OF PRODUCTION MUST BE IMPROVED

A By a maximum price and minimum wage policy for all important industries, which takes due account of the most efficient production technique, reinforced by the reform of patent laws to prevent sterilisation or abuse of patents

B By the continuation of the production of standardised manufactured goods (utility goods) at controlled prices. Tax reform should be used to discourage excessive competitive advertising and salesmanship. In these ways the present excessive cost of distribution could be lowered

¹ If consumption has to be severely curtailed, there might have to be a continuation of rationing. In deciding whether to finance investment by taxation or by loans, the prime consideration should be the maintenance of full employment, the secondary consideration, the effect on incentive, but some importance should be attached to the requirements of achieving a better distribution of national wealth.

- C Direct State control should be established over all industries which are by nature monopolistic. In this category belong public utility services, such as water, gas, electricity and transport, certain natural resources such as coal, iron ore and timber, whose supply is limited or has widely varying costs, finally, industries where efficient units of production are so large as to preclude the free entry of new competitors¹

Compensation schemes might be established in industries which are controlled indirectly (i.e., by price and wage control) in order to speed readjustment without imposing unequal sacrifice

- D In order to ensure efficient planning of towns and utilisation of land the ownership of land should either be nationalised or pooling arrangements made to enable central planning, including agriculture. The location of industry should be decided upon on the basis of social, and not existing private, costs, i.e. with due consideration to the indirect repercussions of the establishment of new and/or the extension of existing factories on the community—e.g. housing, transport etc. Should the control of industrial location result in an increase in the cost of production to individual entrepreneurs, this should be offset by a modification of transport and other public utility charges. This would be possible if public utilities were under State control. The alleviation of charges should be available to all, without discrimination

(III) A MORE EQUAL DISTRIBUTION OF INCOME MUST BE SECURED

But taxation should be modified (e.g. by the introduction of a graduated annual capital tax and similar measures) to minimise the deterrent effect of progressive taxation on individual initiative. Taxation should be reformed to limit, wherever possible, the incidence of taxation on marginal income derived from additional effort

(IV) GENERAL POLICY

- A Social security should be guaranteed in the sense that all who are at work, and those who are unemployed not by their own fault, should be assured a minimum standard of life. The finance of the appropriate schemes should be met by general, and not by special (which usually means regressive), taxation². It must be borne in mind that social security and a full employment policy do not and cannot mean that workers, managers and investors in any given industry can be guaranteed wages or profits, however inefficient they are or however the demand for their product may have changed. It means that all have a reasonable expectation of help and opportunity to adapt themselves to the new position and that destitution and bankruptcy will be replaced by State co-operative planning as a means of enforcing economic readjustment
- B Part of the fruit of the increased efficiency and effort will have to be diverted to help the increase in the standard of life of the dependent Empire and Europe. Only a part of this can be accomplished in the form of new interest bearing private investment. As far as the Colonies are concerned, their standard of life should be increased by applying the same principles of price and wage regulation as well

¹ Cf. also (I) A (a) (*)—on page 141

² Sir W. Beveridge's Scheme, which places a heavy poll tax on workers and on employment, should accordingly be modified

as direct State control over industries, as apply in the Mother Country. This would prevent the present monopolistic exploitation of the Colonies. The system of taxation of the Colonial Empire must be drastically reformed, in order to secure that profits earned by the exploitation of natural resources in those Colonies should be used in the development of those areas.

- C. The control over foreign payments and foreign trade must be maintained. A system of international planning of production and exchange of goods and services should be attempted on the basis of the principles elaborated for home policy. Commitments (such as the present Wheat Scheme) by which foreign markets are apportioned by quota agreements, irrespective of the production cost to the exporting countries, thus protecting inefficient producers, should be rejected.

2 INSTITUTIONAL REFORMS NECESSARY TO PURSUE THESE POLICIES

(I) THE CIVIL SERVICE

- (a) Recruitment and promotion in the regular Service must be adapted to encourage greater initiative and decision.
- (b) The selection and remuneration of temporary Civil Servants, especially those entrusted with the management of publicly-owned Corporations, must be on a business basis, including economic incentives for efficiency.

- (II) Departmental organisation must be re modelled on a functional basis, in accordance with the recommendation of the Haldane Committee, which sat at the end of the last war. A small Cabinet deciding general policy should be continued. A Ministry of Employment should be established, charged with the duty of maintaining full employment. This Ministry should assemble, supervise and present to Parliament the State Capital Budget, including the investment of all Departments, of Public Corporations and investment abroad. The Budget should be framed on the basis of current estimates of national income, consumption and investment, the Treasury to continue to be responsible for the supervision of all current expenditure and for the financial supervision of capital expenditure decided upon. The control of private investment (including banking policy and capital issues) and the co-ordination of the policy of the raw material controls should also be allotted to the Ministry of Employment. It should further be charged with the general supervision of price and wage policy, which should, however, be executed by the Ministry of Labour and the Board of Trade respectively.

- (III) The Board of Trade, under the general direction of the Ministry of Employment, would have to be responsible for measures ensuring industrial efficiency. Company Law should be reformed to ensure uniform accountancy and complete publicity on costs and prices. Chartered Accountants should have to submit to the Board detailed reports which should be made the basis of price policy. Industrial tribunals might be established to hear appeals from the decisions of the Board. All international schemes for the control of production or prices or the establishment of stocks, should be made by the Board and not by producing interests. The Board should finally be responsible for the management of such raw material controls as are maintained and for the production of utility goods. It should

have exclusive power in arranging compensation schemes or statutory schemes for the orderly readjustment of the productive structure to new conditions

- (IV) The management of agricultural policy, especially in respect of prices, should not revert to the representatives of producers. If the stimulus to home production through subsidies is continued, it should not take the form of paying uniform prices to cover costs of the highest cost producers, but should, as far as possible, be arranged on the basis of differential prices on long-term purchase agreements. The Ministry of Food should continue to be responsible, both for home food prices and the import of basic necessities, the supply of which is secured by long-term agreements. The scope of the Ministry of Agriculture should be restricted to the supervision of efficient production.
- (V) Steps must be taken by education to increase the skill available to industry, and by an improved general health service to prevent loss of production.
- (VI) To permit a more effective Parliamentary supervision of the Executive, Standing Committees should be formed to supervise and question the Government. Unless Parliamentary democracy can give the Administration the powers it needs to ensure economic stability and progress while retaining ultimate and informed control over it, Democracy will lose in the long run its present supremacy in economic affairs over systems where decisions are made without consultation and imposed by force.

IV THE PROSPECTS

Reforms on the lines proposed are not revolutionary: they represent an attempt to evolve a compromise between private enterprise and public control, in keeping with the traditions of this country which, at least up to 1914, succeeded in transforming her institutions and adapting her policies without an apparent break in historical evolution and tradition. The frustration during the period between the wars, which seriously weakened Britain's international position and contributed to the renewed catastrophe, show that far-reaching reforms have become necessary.

The gigantic military effort which Britain now sustains is not only the clearest proof of what can be accomplished once determination to survive is guided by adequate organisation, but also indicates the extent of the opportunities lost between the two wars. It has been achieved by liberating (by no means fully) the creative power of the nation, hitherto repressed by financial taboos, short-sighted selfishness and the lack of constructive imagination. In spite of devoting well over half of the national income, excluding foreign help, to the prosecution of the war, the level of consumption is barely, if at all, less than the level to which it had fallen during the last depression. Social security has been achieved by

development. The "realists", who advocated appeasement of Hitler and Mussolini, who preached us back on to the Gold Standard, and predicted the ruin of the country in 1931, seem to be regaining their self confidence and are creeping out from the holes into which they were thrust by the fall of Chamberlain.

It would not be true to say that a combination of monopoly capitalism with Trade Unionism, a sort of syndicalist economic system, could not provide economic stability. But it will be a stability at depression level with unemployment sufficiently large to prevent inflation and to prevent full economic progress and the shouldering of international obligations and tasks. It will mean a further ossification of the monopoly controls now established as parts of the State machine. Instead of asking for responsible co-operation, and at the same time granting the status of equal partners to the workers, Governments of the Right will try to bribe the masses by concessions. They will be abetted, not only by the leaders of the sectional vested interests of the Right, but also of the working class movement as at present organised, for the latter have always implicitly accepted the *status quo*. Thus, in failing to establish a sound social fabric, though without being able to provide prosperous living conditions, the country will find too onerous the economic effort required by her position as a first class world power.

Lastly, there are already signs that the reactionary elements in the United States will try to use reactionary Quislings, certainly "up to", but perhaps even within, the boundaries of Germany. The re-establishment of the German Catholic Centre Party, backed by industrialists and with, say, Dr. Brüning as its head, has manifold attractions to Wall Street, yet it could not but end in renewed calamity. The Atlantic Charter demands that all sovereign States are to be restored without any qualifications. Is this to mean the reinstatement of the petty dictatorships at the cost of impoverishing Europe?

Many people of goodwill would be prepared to make grave sacrifices to come to a post war "agreement" with the United States. They do not realise that the cost of this agreement might be nothing less than the sacrifice of Britain's chance for reform. The United States might be unwilling to contemplate planning. Britain cannot remain a great Power without it.

The proposals outlined in this paper may not be over cautious but we cannot afford caution in the post war years any more than

we could in the unhappy period before the war. Caution is nearly the same idea as appeasement. A cautious policy would make a co-ordinated forward move impossible and plunge the country into decay, if not disaster. It is important to initiate measures of internal reform at the earliest possible moment. Only by an earnest of her good intentions can Britain assure for herself leadership among the progressive people of other countries and continents, or hope to strengthen them in their own internal struggles against the forces of reaction.

As yet the implications of the issues are not wholly realised in Britain. As yet the representatives of both the Left and the Right are too intent on safeguarding immediate interests to be able to retain their sense of proportion and keep in sight the ultimate national and international ends. Manifestos are issued, but little action follows.

The people of this country must be made to understand and must be warned, both that it is in their hand to grasp the opportunities which peace will bring, but equally, that the present policies, and the present attitude of mind, will inevitably lead to poverty for the individual and eventually to the decline of the nation.

F BORKENAU

NEW POLITICS

The complete revolution which has come over politics touches us all

When Napoleon had conquered Germany, he wanted to make the acquaintance of the greatest German then living, Goethe. The poet was ordered to Erfurt where Napoleon held court, and the two had a long talk. Among other subjects they touched upon the "tragedies of fate" which were in fashion at the time—plays where the hero despite all his efforts was drawn into the abyss of some mysterious inexplicable destiny. "What do they want with their destiny," Napoleon exclaimed angrily. "Today politics is our destiny."

Napoleon was probably ahead of his day with this view as with so many other things. We need only glance into any of Jane Austen's novels to realise how little affected ordinary lives were by the period of twenty three years of revolutionary and Napoleonic wars at the end of the eighteenth and the beginning of the nineteenth century. But today Napoleon's phrase would provide an apt motto for all our lives. From the query whether we are to be or not to be, down to the smallest details of everyday life, politics today rule our destiny. There is no family, no business, no religious movement, no piece of poetry, nay, no love affair, where politics do not interfere. Side by side with the development of modern industry and technique, this is certainly the biggest change that has come over the world during the last century.

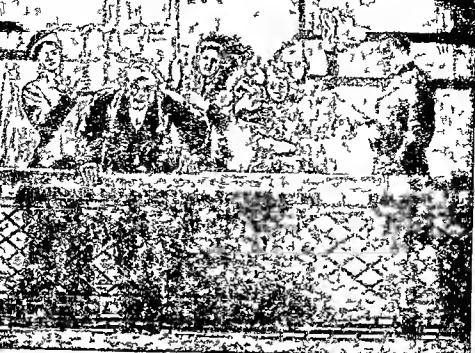
In this country some people may still be inclined to think that this paramountcy of politics is only due to the war and will disappear once it is over. In fact, the war has only brought to England a form of life which, at least in a large part of Europe and Asia, had been normal for at least the last ten years. Even now, Englishmen experience rather less interference with their everyday

life than the average German experienced in "peace" since the advent of the Nazi régime. The amount of state control and state interference in Germany, however great it may be, is nothing compared with what the ordinary Russian had to put up with during the period of the first Five-Year Plan, between 1929 and 1934.

Napoleon was not only the best prophet of this new age. He also, in his own person, anticipated many of its chief characteristics. He was a lone figure in his own day, a dictator risen from below, who had become much more powerful than any hereditary prince. Today, unfortunately, the world is full of such dictators. He won the support of the French by stimulating their thirst for glory, their exalted nationalism. He was then an innovator. Today, all dictators are popular with their respective nations to the extent that they succeed in instilling feelings of furious nationalism into them. Napoleon brought an age of war over Europe. So do our modern dictators. He started on a ruthless career of conquest, of oppression of foreign races. So do they. He abolished all political parties, all liberty of the press; he subordinated education and attempted to subordinate religion to his personal power and glory. So does Hitler. So do his many satellites.

People in this country sometimes tend to regard this ruthless crushing of privacy by politics as an unholy foreign affair whose impact upon English life they want to fight off. There seems to exist a widespread idea that we are fighting this war for no other purpose than to fight off the impact of these extraneous forces on the English way of life. In a sense such a conception is justified. The English tradition is liberal, if anything. And liberalism is the direct opposite of a totalitarian régime. Liberalism is a doctrine and a way of life tending to reduce the importance of the state and of politics to a minimum and to leave a maximum of scope and freedom to the individual and his private interests. In this war England and America are doubtless defending their liberal heritage against the impact of totalitarianism.

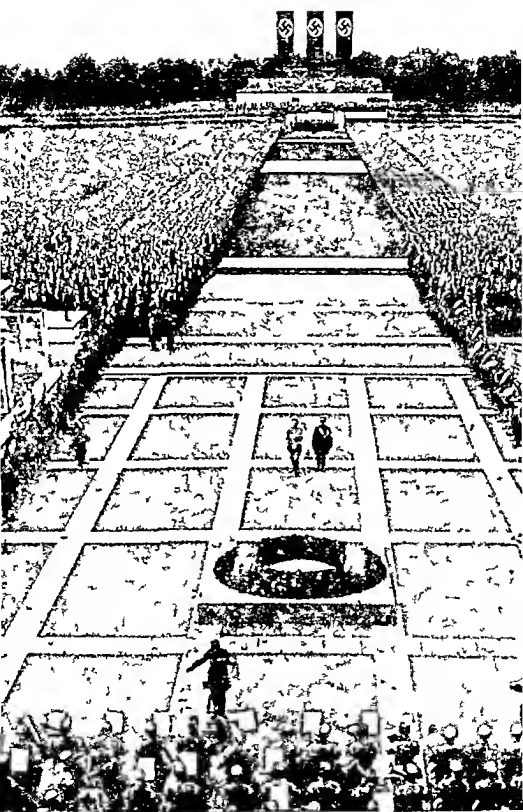
As a result of a long history of compromise and moderation the Anglo-Saxon nations have come to shun all extremes. Totalitarianism with its ruthless insistence upon the total insignificance of the individual as against the state is such an extreme. It is not conceivable that Englishmen and Americans should be anything but disgusted when confronted with it.



THE OLD ERA OF LIBERAL POLITICS FOR THE MIDDLE CLASSES
Mr Gladstone addressing the crowd from Lord Rosebery's house 1880

But this is only one side of the story. In another sense the totalitarian systems are not at all extraneous forces, mechanically pressing from outside upon liberal England and America, but no more than extreme instances of trends existing and growing throughout the world, England and America included. In order to realise this we must only ask two questions. Were England and America still liberal countries before the war started? Are we going to return to liberalism once the war is over? The answer to both queries is clearly No. Hence it is clear that the same forces operating on the continent are also operative in this country and across the Atlantic, though in a different manner.

Some may be inclined, in order to avoid this conclusion, to start an argument about the meaning of the term liberalism. But such arguments about words are sterile. The essence of our contention can be quite simply put in a few sentences. About a hundred years ago there existed, in England and the U.S.A. at any rate, a system where state interference with the life of the individual was reduced to a minimum. We call these early and mid-Victorian days the liberal era. From England it spread eastwards, though with growing distance from its country of origin the liberal movement lost strength. It was weaker in France than in England, never won fully through in Germany, only for a short



THE NEW ERA OF THE DICTATOR AND POLITICS FOR THE MASSES
Hitler with Captain Roehm at the Congress of Victory, September 1933

time touched the surface in Russia, and only its verbal symbols, not its real tenets, ever reached Asia. Then gradually a counter-movement started, a movement in favour of all-round state interference, leading up to complete supremacy of the state in every sphere of life. We are now experiencing the climax of this movement in the totalitarian dictatorships of the continent and of Asia. The modern revolution in politics consists essentially in this transition from liberalism towards totalitarianism.

Now it might appear as if this change were a result of the interaction between the Anglo-Saxon world on the one hand and the continent and Asia on the other. First the Anglo-Saxon world gave liberalism to the world across the Channel. Then the continent and Asia, deeply steeped in the traditions of autocracy, re-asserted themselves and are now strongly influencing even England and the U.S.A. as two or three generations ago they were influenced by them. There is something in that, but it is probably less than half of the truth. The curious fact is that at least some of the trends opposed to liberalism made their first appearance in England and America.

There is, for instance, the growth of democracy which is so often but quite wrongly identified with the growth of liberty. There never existed greater liberty of the individual than in the classical age of liberalism. During that period about a century ago there did not only exist complete liberty of religion and of political opinions, of the press and of printing, and very effective safeguards against wilful arrest; it was also an axiom that in no conceivable way might the state interfere in business affairs. But while there



THE PRESS YESTERDAY—plenty to read for the educated and leisured classes—the "Daily News", 26 July 1883. Notice the restrained headlines for some remarkable stories!

was much liberty there was very little democracy—if by democracy we understand the participation of masses of ordinary people in public affairs. The rise of democracy is altogether a modern growth and, strange as it may seem, is closely connected with the emergence of totalitarian trends.

In mid-Victorian days the U.S.A. and Norway were the only countries with universal suffrage. The suffrage in England, despite the reform of 1832, was extremely restricted. Newspapers were written only for a select few. Quite apart from their price they were out of reach of the man in the street because they were written in the high-brow language of Oxford rather than in the language of common people. Also huge numbers were completely illiterate. Public meetings were a rarity and frowned upon. Even as late as 1879 Queen Victoria was very angry with Gladstone for having started a public campaign about the Bulgarian atrocities. A Prime Minister making public speeches to the rabble! For the common man to get into Parliament was very exceptional, and cabinet posts were the preserve of a very small circle. Naturally the great masses had hardly any interest in politics. And politics therefore were conducted with the restraint, the coolness, the scepticism and the manners characteristic of "society".

Just contrast this picture with the political agitation around Lloyd George or around Theodore Roosevelt in the beginning of our century! Everything is changed. The masses have the vote and use it. The pressure of mass movements is constantly brought to bear upon politics. A vast popular press—"written by office

More Precious
ELLIMAN'S
ENDOTOXIN

LATE LONDON EDITION

News Chronicle

MONDAY FEBRUARY 16 1942 **RADIO PAGE 2** **ONE PENNY**

SINGAPORE FALLS: PREMIER S
Japanese Say British Were Taken Off
Before the Capitulation

THE JAPANESE HIGH COMMAND YESTERDAY ANNOUNCED THE UNCONDITIONAL SURRENDER OF SINGAPORE—A WEEK

LET US MOVE FORWARD STEADFASTLY INTO AND THROUGH THE S
Mr. Churchill addressing the British

THE PRESS TODAY—huge headlines for the newly literate masses—the "News Chronicle" (descendant of the "Daily News") 16 February 1942

boys for office boys", as Lord Salisbury contemptuously described the *Daily Mail*—caters for the tastes and interests of the man in the street. Politics has become a fierce unmannerly business. The emotional appeal, no longer the rational argument, counts for everything. Political agitation must successfully compete with the cinema and the football match. Naturally huge party organisations arise in order to cope with the immense numbers now involved in politics, and at their top there appear leading figures who rule their followers by their personal spell and by their ability to control the machinery of mass organisations, much more than by their programmes. Parnell and Gladstone were probably the first men able despotically to rule great mass organisations in this manner.

It is obvious enough that the difference between these things and present day politics on the continent is only one of degree. More precisely the difference between the role of Parnell, a Gladstone, a Lloyd George, or the two Roosevelts, on the one hand, and of a Hitler, Mussolini, Lenin, Stalin, Atatürk, Chiang Kai Shek on the other hand, concerns two points only. First the modern dictators secure their permanent sway over the masses by establishing a monopoly for themselves and their parties. Secondly they do it by ruthlessly destroying all their opponents. Yet how ever important these two factors, it remains true that modern democracies and modern dictatorships have three things in common: the intense political activity of the masses, the rise of disciplined mass parties, and the rise of "leaders" with a psychological sway over these masses.

It is difficult to over-stress the emotionalism, sometimes of a very low kind, which thereby becomes dominant in politics. The rise of Fuchrers, the fierceness of nationalism, the brutality of contemporary politics, the harlequin character of much of contemporary political propaganda—so aptly described in G. B. Shaw's *Apple Cart*—are all traceable to this irrational emotionalism. What can be a reasonable solution for these new problems which have arisen during the last half century? There exist very strong tendencies of an entirely practical nature working in the direction of greater power of the state over the individual, and of greater concentration of political power within a few hands. These needs, today, are mostly discussed under the popular heading of "Planning"—"Planned Economy" and so on. If I do not say much about it in this short survey, it is because in Chapters 10 and 11 Dr. T. H.

Balogh deals with the revolution in economies. I therefore limit myself to what in this sphere has an immediate bearing upon politics. We are rapidly drifting into economic planning. This is not only a result of the war but a trend clearly outlined before it. The departure from liberal principles in economics started through the claims of the working classes for protection. Once the working day has been limited, other economic groups inevitably make their claims for state protection. Tariffs for industry, and later for agriculture, were introduced in every country, state control of the currency and of banking followed, until the process of state control had become all comprehensive, and only shreds of economic liberty and free competition remained. But what does all round state interference mean in terms of politics? It means that henceforward incomes are determined by politics. A worker's wages, a farmer's prices, an industrialist's and banker's profits are determined, and were determined even before the war, by political measures.

The degree of state interference varies in various countries. And the dependence of the individual upon the state for the safeguarding of his income varies accordingly. Where this interference goes far—as is the case, not only in Communist Russia and in Nazi Germany, but also in the U.S.A. under Roosevelt's New Deal—this or that economic measure of the administration might literally imply life or death for millions. No wonder then that political struggles for control of the administrative machinery become fierce. No wonder also that, precisely at the moments of economic crisis, when quick and resolute decisions are most urgently needed, the political struggle tends to develop towards a hopeless stalemate. No wonder also that, as a result, a clamour for a strong man rises and grows in weight. It was thus that Mussolini in Italy and Hitler in Germany achieved power. It is thus that Roosevelt has achieved a third and fourth term. And if nothing similar has happened in England, the hopeless decay of the distressed areas was the price paid for the lack of a centralised economic authority. Now, under pressure of the necessities of war, England has developed a political regime no less united, no less centralised, no less powerful than that of any dictatorship. And whatever doctrinaires of liberalism may say, this is not entirely the result of the war emergency. The war has only brought about changes long overdue.

Is there, then, no escape from Totalitarianism? This is a problem

which cannot be answered in a few words. It is, perhaps, not easy, but at any rate possible to analyse the trends of the recent past and to understand how they continue to work at present. But the future is quite a different matter, and the prophecies of social scientists have an unpleasant tendency to turn to the discomfiture of the prophet himself. At present, without the slightest doubt, the tendencies away from liberalism and towards something which must be called totalitarianism are very strong, whereas the opposing tendencies are weak. Yet nothing is more certain than that history never for long continues to develop in one and the same direction. There will as certainly be an end to the totalitarian age as there was one to the liberal age. The question is: Can we discover signs of these counter-forces?

Here we are reminded of the fact that, after all, the various regimes which we described as "totalitarian" differ widely between themselves. England and America in war are not even as totalitarian as Nazi Germany was in peace, we said. Germany and Russia differ widely. Thus the universality of the trend towards totalitarianism, which we emphasised so strongly in the beginning of our discussion, is, after all, subject to limitations. The tendency towards centralisation and towards allround state-control is, after all, not the only tendency at work in our era. There are other tendencies too, working for a differentiation between various countries. And it can be said, without exaggeration, that almost all these qualifying factors are opposed to the full success of totalitarianism all over the world.

Take again the case of this country. An outstanding churchman has recently pointed to the huge disparity between the English belief in liberty and the actual amount of regimentation and interference with private lives which does not only exist at present but is going to stay, partly at any rate, even after the war. Yet there is no doubt that the Englishman values his privacy, has succeeded in preserving a great deal of it, and is going to insist on preserving as much of it as is at all compatible with a well organised twentieth-century social structure. Once, in the liberal age, this liberty was regarded as the all important matter, and nearly every other consideration was sacrificed to it. The country might be unable adequately to interfere in world affairs, the individual might starve. No matter, if only liberty was preserved! Today, we are very far from such a viewpoint. We have deprived individual liberty of the status of an omnipotent godhead, which it had

arrogated to itself in the liberal age. Yet, as a mere matter-of-fact, no longer in recognition of any exclusive claims of a religion of liberty, individual liberty is still valued, and is honoured where this is possible. Today it is the opposite claim, the claim of the country upon the individual, which tends to be regarded as overriding every other consideration, and in a national emergency this must be so. But as liberalism ultimately had to give in to the claims of the poor, to the demands of power politics and to other aspects of life it had unduly neglected, so the State, where it claims to be total master of every individual life, must clash with other claims and other demands which are as inextinguishable as those of the community. Precisely such an exclusive claim of the community over the individual is involved in the very term "totalitarianism". Putting the whole matter quite simply, it stands thus. There are various aspects of human life, which sometimes must clash. There is need for central control, and this need has greatly increased during the last hundred years. But there is also need for independence of the individual. Whoever neglects one of these basic, unalterable needs of human nature must fail in the end.

The present differences between various countries are already, to a large extent, the result of the varying degree of resistance to state-control offered by their populations. In fact it seems largely a matter of national character how far peoples are ready or unready to submit to it. Russia on the one hand with its deeply ingrained tradition of common ownership of the soil and America on the other hand, with its tradition of the independent pioneer, may represent the two extremes, other countries standing in the middle. But no country can ever become totally totalitarian in the sense that all activity should ultimately emanate from the state. It is quite conceivable that the political sphere in some countries, will be completely dominated by a dictator and his party, for quite a long period. But here the consideration comes up that as much as different peoples are pliable to state interference to different degrees, so the various spheres of life are also permeable to state control to very different degrees.

Politics are certainly the sphere of life most easily regimented. It was perhaps a great mistake of liberalism to attempt to give to the principle of liberty in politics the first place, or at any rate second place, next to economics. There are other spheres of life much less permeable. Family life is by nature, in the main, out-

side the sphere of public control. The totalitarian dictators know it. They try to destroy the family, as they cannot control it. Art and science also wither where they are too directly controlled. But after all, a country can dispense with art and science, at the price of becoming barbarian. The most powerful organised resistance to totalitarianism seems everywhere to come from religion.

Religion seems to tend to gain strength to the degree that political and economic liberty disappear. Very naturally! It is a sphere of intimate conviction where the public power cannot reach, and does not attempt to reach if it is well advised. It is the innermost core of life for the believer. It is only natural that the individual, when subject to oppressive compulsion in his outward life, should draw inward, towards religion. It is a process observed in all the dictator countries. Yet, at the same time, religion, being organised in churches, is a force in public life. Its strength derives from the combination of this one entirely personal thing, faith, and this other, entirely group, public and even political thing, church organisation. No dictatorship has ever really succeeded in breaking this rock of resistance. In Germany, in particular, it is to the highest degree remarkable that, while all political parties gave way before the Nazi onslaught, the Nazis do not even dare to attempt to destroy the catholic church (German protestantism is a different matter, for local reasons not to be discussed here). Here is, at any rate, *one* main factor which will ultimately limit the extravagances of totalitarianism.

Once these counter forces have gathered sufficient strength, it may be possible to achieve a better balance between various needs than was the case either in liberalism or totalitarianism. It looks as if it were the historical destiny of the Anglo Saxon world to work out from the basis of its liberal traditions, a compromise between the old and the new, the liberal and the totalitarian systems: a system sufficiently planned, centralised and efficient to cope with the needs of the age of mass production and mass politics, yet with enough liberty to avoid the crushing out of all those higher values which can only be cultivated through individual unregimented efforts. Even so, the danger of tyranny, and the dangers of the crushing of all the refinements of life through the mass mind, will be with us for a long time. But if we know our way they need not materialise. England and the U.S.A. as I said, may work out

a compromise between individual liberty and collective organisation

It is difficult to foresee the concrete forms such a compromise will take. New developments are always utterly surprising. And there is no model in this case which could simply be copied. Thus, our present means of influencing political decisions through free discussion is the party system. We know of no other. Yet the political parties, much as they may resent this statement, are everywhere in obvious decline. It is not only that, in this country at any rate, what differences of opinion there are have little or nothing in common with the existing party lines of division. A new alignment might be thought of. But it is not easy to see one on any party lines. The old divisions of principle seem to vanish, and the new divisions do not seem to be sufficiently deeply rooted to serve as a permanent basis for a new alignment. The same, admittedly, does not apply to those organisations which directly defend economic interests, trade unions, employers' associations and others. No compromise between a liberal and a totalitarian point of view is conceivable which would not include a share for these big organisations of economic interests in the fixing of economic plans. But the sphere of economics is not the only, not even necessarily the paramount sphere of public life, and economic organisations are quite inadequate to deal with non-economic problems. Will there be a selection of a leading or managing group (of fairly large numbers) by democratic processes? It is quite conceivable that this might be so, only the group thus selected would be less of a debating and voting and more of an administrative body. The future alone can teach us about all this. At any rate, winning the war will mean that there will lie a compromise between the liberal traditions of the past and the administrative needs of the present. If such a compromise is achieved, the sacrifices of the war will have been worth while.

EDWARD GLOVER, M D

MAN—THE ANACHRONISM

Why we find new ideas so difficult and perhaps so alarming



DR SIGMUND FREUD

With every advance in natural science the lot of the plain man becomes increasingly hard. Ready to admire indeed anxious to be thrilled by new wonders, he returns from his scientific excursions with his common sense rather mangled and his dignity more than a little affronted. He has encountered concepts of time space and matter that are reminiscent of the topsy turvy laws discovered by Alice in the country through the Looking Glass. That stouthearted little pragmatist, it will be recalled was rather nonplussed to find some inhabitants running very fast in order to stay where they

were and others crying out from the pain of cuts they had not yet received

The would be admirer of modern art and literature is in still worse case. However much he may hide his timidity behind the robust assertion that he knows what he likes, he may be completely baffled by, for example, the manifestations of surrealist art or poetry. Naturally enough he loses his temper. Too much intimidated to abuse the scientist, he vents his indignation on the artist or the

poet, who in return either treat him with an olympian aloofness or appear to add insult to injury by offering him recondite interpretations of their work. It is a hard world. Science and art would both appear to be at loggerheads with common sense.

Now since in Britain, at any rate, the plain man is the ultimate source of social authority, it is a matter of urgency that these abrasions of his common sense should be healed. He should have restored to him the capacity to enjoy peeping through the fringes of the present at vistas of a new age. To begin with, it is some comfort to reflect that this clash between science and common sense is nothing new: also that if common sense errs it errs in good company. From ancient times common sense asserted that the sun went round the earth, and successive generations of "modern" scientists supported this error on the Ptolemaic theory. The revolutionary assertions of Copernicus and Galileo, which, with all due respect to Professor Bernal, were as rich in conceptual implications as modern researches on the material basis of inheritance in chromosomes, aroused in their time the opposition of scientists as well as of lay champions of common sense and of ecclesiastics. To this day the opposition of some natural scientists to discoveries concerning the nature of mind is stronger than that of many intelligent lay audiences. This is due not so much to the scientist's disapproval of psychological research methods as to the fact that modern psycho-analytical discoveries outrage the scientist's common sense. Other things being equal, the man who takes kindly to novelty in the external world is likely to be annoyed by novelty in the internal world of his own mind. All of which goes to suggest that scientist, artist and plain man are alike subject to irrational reactions against the new, the strange and the incomprehensible. The anger they experience is due to unconscious fear, and the fear in its turn to the unconscious belief that whatever is new or strange is likewise hostile.

Now this fear of a hostile outer world is part of that *animistic conception of the universe* which the civilised man shares with the savage. But it is very considerably inflated by any frustration of a hope adult man secretly shares with the infant. Deep in the recesses of the mind of each one of us lurks the belief that he is the hub of a universe over which he can exercise magical control. Even when the suckling's magical formula, "Table, cover thyself," is shattered against hard fact, he still clings obstinately, if a little anxiously, to the view that he will remain for ever the sole focus of

parental attention, and that the satisfaction of his every need will remain assured. Hence anything that disturbs man's snug view that he "knows where he stands" is liable to send him into a childish rage. It was this need for certainty that was exploited with such skill by the Nazi authoritarians. After years of economic and spiritual uncertainty, it was some comfort to the Germans to think that they knew where they stood, even if, as events proved, they found themselves lying manacled.

The conflict between common sense and art is also nothing new. In their time the most innocent Impressionists moved their critics to frenzy and were accused of throwing pots of paint in the faces of the public. Some of these reactions were, no doubt, due to a deep rooted objection to any apparent distortions of reality. Whatever deviates from the photographic, or appears to give the lie to the mirror, arouses man's secret fear of monstrosity. But the deepest cause of the estrangement is brought to light in current reactions to surrealist art. However the artist may manipulate external media of expression, the end product is bound to reflect his own mental interests, patterns and laws. In a sense it is true to say that whatever man creates must be after his own image. Even the negative or destructive orgies of war bear the unmistakable imprint of infantile and adolescent mental function. The apparent incomprehensibility of many art forms is only a reflection of the apparent illogicality of man's deeper mental processes. That they should outrage common sense is only a proof that man's unconscious activities are liable to outrage the more disciplined parts of his own mind. It is one of man's oldest tricks to disapprove of anything that threatens to disclose his own secret preoccupations. And since, as E. H. Ramsden rightly claims, in Chapter 16, some forms of surrealist art derive from man's "sub-conscious", it is not surprising that they should arouse discomfort in those who have little or no feeling for unconscious symbolism. This does not mean that the criticism of the plain man is entirely without justification. The surrealist's ascription of special virtue to his images is largely a form of preciousity. Even the scientist is sometimes guilty in this respect. He tends to talk of "modern science" as if it were an external force, instead of being a mental instrument which can subserve the instinctual urges of mankind. No doubt this quasi religious attitude to science is harmless enough, so long as it does not obscure the fact that man's urges can be destructive as well as creative or conservative. In the last resort the emotional clashes between science, the arts and common

sense are derivatives of more volcanic conflicts that smoulder in the depths of man's mind

By this time the reader may feel that however disconcerting the ideas of scientists and artists may be, they are not so peculiar as those of psychologists, or, at any rate, of those psychologists who accept the teachings of that great conservative and great revolutionary, Sigmund Freud. No doubt it is disconcerting, even annoying, to think that behind our much vaunted "rational consciousness" there lies a vast and complicated mental apparatus concerning which we know next to nothing—that this apparatus is concerned with the regulation of powerful instincts of which we have little or no understanding, that much of its activity is archaic and irrational; and that if the apparatus is thrown out of gear this irrational function can make hay of our more civilised ideals and standards of behaviour. But the psychoanalyst at least can plead extenuating circumstances. Freud's discovery of "the unconscious" and of the laws that regulate this region was a feat unsurpassed in the history of human endeavour. But these discoveries were in a sense by-products. They were made in the course of investigating the causes of mental suffering. Indeed, their manifold therapeutic applications have to some extent dwarfed their more profound social significance. By uncovering the series of passionate conflicts endured by the child in process of becoming a member of the family group, Freud had not only solved the riddles of adult neurosis and insanity but had at one stroke revealed the prehistoric origins of human civilisation. Within the first five years of life, the child recapitulates the history of man's mental development. In addition, Freud had laid a solid foundation for research into the structure of the larger groups, national or cultural, which have developed out of the family system. *Above all, he had shown that there can be no prospect of guiding the future development of nations until we realise that at present their destinies are shaped, regulated and, to a large extent, hampered by unconscious mental mechanisms which, although they served to lead mankind out of a bestial state, have lost some of their applicability to modern life.* We now know, for example, that in human wars two of the ultimate determinants are unconscious, viz. the persistence from childhood of explosive compounds of family hate and love and the unconscious transfer to larger social groups of reactions and mechanisms which are only appropriate in the nursery. Were it not for the physical impotence of nurslings and the powerful physical and moral sanctions instituted by parents, family life would be subject to periodic dis-

integration Parenthood would, in fact, be scheduled with good reason as a dangerous occupation Small wonder, then, that these same nurslings grown to adult stature and with sufficient brains to harness the incalculable forces loosened by scientific investigation can periodically reduce their peacetime organisation to chaos, as a child will dash to the floor its castle of toy bricks Here we stumble over the last and most realistic factor in man's present state of disgruntlement about the future He has every reason to be disgruntled, anxious and nonplussed by current events *His familiar social organisation threatens to come to pieces in his hands* It is once again in a process of violent transition which might indeed be called a preamble to revolution For though man, the individual, has not changed much since the Stone Age and can be depended upon to produce the same old family reactions century after century, the social groups in which he exists have shown a process of alternate expansion and upheaval No doubt many of the expansions are rendered inevitable by altered economic conditions, and to that extent are reasonable enough But economic changes may develop so rapidly and on so gigantic a scale that man reacts more like a frightened rabbit than a reasonable creature He opposes every new upheaval with all the obscurantist tricks he has practised since the dawn of history And so he lands himself from time to time in wars that not only reduce civilisation to a contradiction in terms, but accelerate the processes of social disintegration he had hoped to arrest Here we can study in action the disadvantages of an unconscious mechanism technically described as *displacement*, i.e. the unconscious transfer of infantile loves and hates from an original family figure to persons outside the family, to groups, to ideas and even to inanimate objects or representations, such as swastikas Granted that this mechanism has contributed materially to the range of man's mind and so to the spread of civilisation, it must be admitted that its automatic application to group affairs is fraught with danger When groups are apparently stable and familiar, as in occasional half centuries of peace, displacement works comparatively well The English man can love his England as he once loved his family group and yet tolerate the existence of other nations In short, he can establish checks on his primitive hates and fears But when groups change, and he has to transfer his allegiances to new and more ponderous forms of society, the situation is perilous Primitive tribes have been known to go to the wall under the sudden and stunning impact of a more complicated civilisation To be off

with the old love and straightway on with the new is even less feasible in social affairs than in personal relationships. After a broken love man tends to go to seed, to regress to more primitive levels in which insecurity and fear may be activated and hate unbridled. The situation may be compared to the transfer of high explosives from one wagon to another. In the process of transition safety catches may be loosened with all the risks of immediate explosion. It is true that a new group of continental dimensions may appeal to our ideals of universal brotherhood, but it may equally provoke the hostility with which the average man would greet the appearance of a rhinoceros squatting in his flower garden. The moral is clear. *No group ideal can hope to capture the free allegiances of mankind which does not at the same time preserve the cultural heritage of the family and eliminate its primitive hatreds and despotisms.*

But there is a certain rough justice about the interaction of unconscious mechanisms. Although they may obstruct the utopias of the enlightened, they can also defeat the schemes of the most confirmed despot. When the Nazis boasted that their New Order would endure two thousand years, they thereby confessed their first premonitions of defeat. So much is obvious. But they did not realise that, by their revival of the more savage features of tribal government they were invoking an unconscious reaction which, though slow in operation, is almost as certain to follow the appropriate stimulus as a knee jerk to follow the tap of a reflex-hammer. Once upon a time the unconscious conflict of the generations was conscious enough and took forms that periodically disrupted the family. Down even to historic times the fight between the old and the young was waged unceasingly with tooth, claw and sacrificial knife, and to this day it is re-animated in each one of us as we struggle through infancy to adolescence. But though its primitive jealousies and hatreds are now submerged and held in check by moral impulses derived from family love, this conflict still retains much of its original ferocity at an unconscious level. Even now the antagonism filters through and is responsible for the thousand and one forms of sowing wild oats adopted by the younger generation. For that matter it can be held responsible for our reactions to brass hats. But its most significant forms are not those concerned with personal antagonisms, rebellions and usurpations of authority. The conflict can be displaced to the realm of ideas, producing, for example, swings of the pendulum in politics, art and literature. In many instances the swing from

revolution to counter revolution may cover thirty to fifty years. But sooner or later the conflict of the generations performs its most useful, if unwitting, service in modifying those revolutionary or reactionary changes which threaten the solidarity or safety of mankind. Once the more strident children of the revolution or the more incurable despots have themselves produced a new generation, they have thereby submitted the excesses of their political systems to a millstone that will grind no less thoroughly because it operates through the minds of their own offspring. It is a wasteful method admittedly, slow and capricious in action and motivated by hates and jealousies that were better dead. But until we are able to regulate changes by more objective or scientific criteria, it provides a rough alternation of phases from which if we take a long enough view a balance of continuity may be struck.

In short, if we would speculate usefully about the future, we must realise to what extent it is predestined by our unconscious past. The most vital problem of human development is, now as heretofore, how to tame and transmute those primitive instincts which if left unmodified and unsatisfied act as a hindrance to rational adaptation.

Let us consider one more example. All stable societies depend on the consolidation of social friendship between men, with or without a personal leader. But this is to some extent bound up with a primitive system of segregation of the sexes. The segregation is secretly motivated by ancient fears and was originally maintained by primitive taboos, some of which can be studied in the Book of Leviticus. It is interesting to reflect that the English Public School system is derived from the "youth movements" of savage tribes and that the "dormy house" of the local golf club is the lineal descendant of the male "community-huts" still to be found in the Malay Archipelago. But in modern times there is a heavier price to be paid for irrational jealousy, antagonism and segregation, for instance, the almost hypnotic suggestibility of masses, particularly of young males, their susceptibility to reactionary forms of propaganda and their tendency to pseudo religious Führer-worship. Last, but by no means least, we must realise that masculine solidarity can lend terrific force to man's periodic orgies of destruction. But for it every army in Europe would disband itself tomorrow. Here is the kernel problem with which everyone who studies the unconscious mind is faced: how to modify the ancient canalizations of human impulse so that man's

otherwise we are sure to have zealous reformers promoting societies for its abolition. In fact, no reformist movement can hope to succeed in bringing about more useful adaptations to the stresses of life unless it recognises that our "unconscious" is also responsible for the measure of success with which we have controlled the primitive forces that lie fathoms deep in our minds. And for the matter of that, even some of man's superstitious reactions have not yet outlasted their usefulness. It is a sobering reflection that if our Western Civilisation had still preserved the tabus regulating head-hunting, even a world war would automatically come to an end within a comparatively short time. All those engaged in active killing would perforce have to go into isolation and carry through purification rituals that would put them out of further offensive action for months at a time. Displacement, as I have said, is a double-edged instrument of mind. It can bring distant peoples within range of our sympathy but it also can bring them within the range of our indifference to destruction. And so, with our destructive capacities raised to the n th power, we have for the time being lost our older and, in some respects, more humane control of killing. It is a disconcerting as well as a sobering thought. But it does not justify an attitude of pessimism. Taking a long enough view, we may regard ourselves as in a state of transition where we are off with some of the old laws before we are on with the new. These new laws must be based on positive ties which are at least as strong as those we have gradually loosened. At the least we must not supplant our outworn superstitions with new codes based on a science that is barren of psychological understanding. Without psychological understanding our chances of survival are little more than even.

We can now offer a tentative answer to one of the questions propounded by Herbert Read in his opening chapter. Is there a pattern to be "discerned in the interwoven fabric of our dreams and discoveries"? Or is it all just chaos? Much of our concern with "pattern" has been stimulated by experience of the objective world, but the *desire* for pattern lies in our own hearts. That is why we are so disappointed when scientists, discovering a new pattern, appear to destroy the old familiar ones. If an electron behaves as a particle of substance on Mondays and Thursdays, and as an unsubstantial vibration on Tuesdays and Fridays, that is its nature. There is no real need to be shocked. In any case, the middle-aged lady seeking to reduce her waistline will not believe a word of it, and those who enjoy the disappearing tricks of con-

C D DARLINGTON, F R S

NEW IDEAS IN EDUCATION

What effect will they have on our children when they grow up?

Some years ago, one Saturday afternoon, I was inspecting the empty sixth form room of a great school. The headmaster had evidently been addressing the boys on the history of Sparta. On the blackboard was chalked the genealogy of King Leonidas, whose story we all remember. But that morning Hitler had taken possession of Austria and it occurred to me that this event gave an



TRADITION IN EDUCATION
—Dr Thomas Arnold 1795
1842 Headmaster of Rugby
School Founder of the British
Public School system with the
emphasis on character and trad-
ition and just a touch of snobbery

air of unreality to what had no doubt seemed most real and most important in the schoolroom. This unreality is no less obvious today when that schoolroom, like so many others, has been blasted by Hitler's bombs.

If indeed one looks back on the history of the twenty years of *inter bellum* one is bound to admit an unreality in a great deal that was said and done and especially taught in this country. The

contrast of wealth and unemployment, of parliamentary eloquence and military unpreparedness, of a subsidised agriculture and an underfed population, of prodigious scientific discoveries and an inability to use them—in a word, of a people capable of being led and a government not knowing where to lead them—all this showed a lack of grip on real things

It was indeed unreal because we know that in this country, scattered among the mass of the people, we have the native wit and resolution to manage our affairs better. To bring out and to make full use of these capabilities we have to give first place to education, and education in this country is undergoing the revolution that might be expected. To understand how this revolution is coming about we must first see what it is that we have inherited.

Our educational system has been derived in the main from the piety of mediæval benefactors. These men wished to make it possible for the children of the poor to live a good and useful life. The children of the rich needed no such charitable care. The court and the camp provided for them. For the poor, therefore, little schools were founded. Singing was taught, and writing, both of them in Latin, the language of religion and of learning. When the Reformation came it displaced the Latin religion but, at the same time, the Renaissance reinforced the Latin learning. It was in Latin that for two hundred years philosophers and men of science, Bacon and Descartes, Newton and Linnæus, continued to write.

But a change gradually took place. The language, first of literature and then of science, became that of ordinary life. Latin, from being useful, became ornamental. From being a source of everyday knowledge it became an exercise for the mind, the outward sign of erudition and refinement. While this was happening, the children of the well to do began to patronise the grammar schools. Paying pupils were taken. Where the endowment was rich the tone was improved. Expensive dress was required. The age of admission was raised. Eventually city schools were moved into the country and boarders were taken. Gradually the poor boys were found to have been excluded. Their privilege had become, accidentally as it were, the valued perquisite of the rich.

The same thing happened at the old Universities. The Colleges became richer and as they did so Chaucer's poor "clerk of Oxenford" was replaced by a more affluent generation of scholars and of dons. So it was that in both school and university, as the old

subjects of classical learning became more remote and less useful, those who were taught them changed too, and the system remained, or seemed to remain, perfectly appropriate

This was the position when a crisis in English education was reached a hundred years ago. The Industrial Revolution had shattered the ancient foundations of English life. An immense new source of power and wealth had been discovered in mechanical invention. Was our education to be adapted to the new

conditions? Or was it to bind itself to the traditions of the past? Dr Arnold, headmaster of Rugby, by his influence largely held the issue in his hands. He himself was a churchman. He was schooled in tradition and it was to tradition he turned as a barrier against new knowledge. He also knew from the Greeks that rhetoric was noble and mechanics was base. He preferred rhetoric. He decided for character against intelligence, for scripture against chemistry, for the dead languages against the living. Dr Arnold preferred things dead, and where a language, like French, was still living, he urged that it should be taught "as though it were dead", by grammatical rule and not by reading and speaking it. Grammar was safe and sound, but reading French literature might lead anywhere. And with the repetition of grammatical rules in language was conveniently combined the repetition of moral rules for conduct. Where the scriptures were lacking, had not Plato and Cicero laid down admirable precepts for the guidance and maintenance of a governing class?



BRITISH PUBLIC SCHOOL BOY
—conformity of dress (expensive
dress)—conformity of opinion
—loyalty—but lack of originality
He has governed England for a
hundred years

These practices confirmed the old scholastic habits of the universities, and the young sciences came, so far as they were taught at all, to be taught in a

REVOLUTION IN EDUCATION

*For him science means adventure
When he is grown up it will mean
initiative and power to cope with this
changing world (photo from Impington
Village College)*



grammatical rather than an experimental way. Physics and chemistry, to be sure, soon escaped from this straight-jacket, but botany and zoology have long remained in its grip, a grip which has been tightened on botany by its use as a ritual introduction to the medical curriculum. Indeed, there are not only museums, but even universities, where these subjects still exist as an esoteric branch of grammar whose rules are changed only with the replacement of one high priest by another.

Dr. Arnold's system was so successful intellectually and socially throughout the older schools that it began to be imitated wherever new education sprang up. Girls' schools and colleges imitated the syllabus for boys. Macaulay transplanted the system to India with splendid—and later with terrifying—success. And when a new system had to be set up for the working class it became a reflection of Dr. Arnold's achievement. But as the competition of other industrial nations began to be felt, some technical and mechanical training was found to be necessary. It was added as an unrelated trimming, not as part of a real education.

Such was the broad inheritance of English education. It had many virtues. It gave conformity of opinion and action (under the name of character) where such conformity was needed. It gave unlimited loyalty in place of unlimited self-interest. It

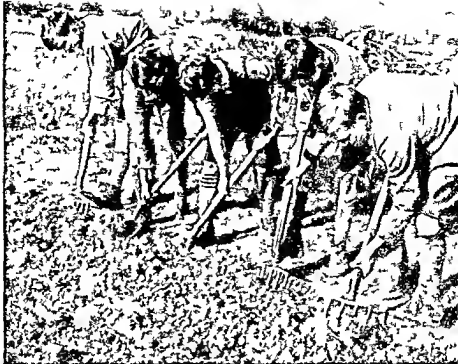
abolished the ruffianly politics of the eighteenth century. And it provided the idealistic basis that was necessary for the administration of a material empire and even for its enlargement.

But, as we saw, the defects of this system, noticeable in peace time, became threatening and occasionally calamitous in time of war. What do these defects arise from? They arise first from a separation between the schools (and universities) and the world outside them. The system of teaching and the subjects taught had been handed down generation after generation. The tradition had been developed by men largely protected from the hard buffets of the changing world outside. Secondly, these defects arise from a separation of different social classes, between which education has raised the very barriers it might have broken down. And finally they arise from a separation between rhetorical and humane learning on the one side—the upper side—and mechanical and scientific learning on the lower side. All this separation was unreal because the world outside did matter, the different social classes were not clearly different in inherited aptitude, and the division of the humanities from science was destructive of the educational value of both.

On the other hand, where this system has failed to separate it has made its most grievous error. It has failed to separate children according to their individual and inherent capacities. It has followed rather the social and intellectual prejudices of parents and teachers, guided by opportunities and affectations that have no bearing on the life and work of the next generation. And in attempting to make children uniform it has often succeeded in making them uniformly dull.

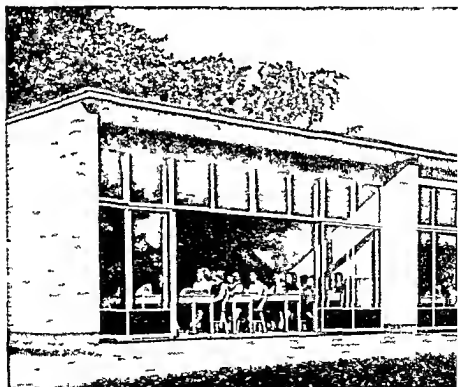
Is it any wonder, therefore, that in this world of schools the young inventor has often passed for a dunce and the young poet or musician for a half wit? Or that some of the best abilities in this country have often been forced by snobbery or indifference into trades and professions which throttled their possibilities of development? Or that the favoured examinee has often disappeared into obscurity or distinguished himself only by obstructing the methods of thinking and acting he was so efficiently taught to despise?

Now in the course of this history there have been plenty of wise men who have taken a different view of education from Dr Arnold and his successors. Erasmus, Milton and Rousseau all had something to say about education that is contrary to the



MODERN EDUCATION

—a lesson in practical art and craftsmanship Is it also a training in character?
(photo from Linton Village College)



MODERN SCHOOLS FOR MODERN EDUCATION

—the class room wing at Linton designed by Maxwell Fry and Walter Gropius
(one of the leaders of Modern Architecture)

orthodox view and very much to the point today. They taught that the individual should be given some choice in his training, that nature should sometimes have its way, that education should not entirely lose sight of usefulness but rather that the child becomes a citizen and must be trained for the duties of citizenship by knowledge of the arts and sciences that happen to be useful at the time.

What influence have these views had? Their first effect was not on the great body of education which was too deeply entrenched to be attacked. They first established themselves in the most modest beginnings—in the nursery schools and kindergartens. Here the pioneer work of Pestalozzi, Froebel, and later Montessori, took effect. Children—up to the age of five or six—were actually encouraged to develop their own initiative, to construct, to invent, to ask questions. Of course, after this pleasant interlude the harder training of school followed and these early effects were largely destroyed in the individual child. But the example of these experiments began to make itself felt. The difficulty of modifying our educational system now became apparent. Education is expensive. Governments, which are not themselves experimental, are usually chary of experimentation. New experiments could therefore be undertaken at first only for the children of the well to do.

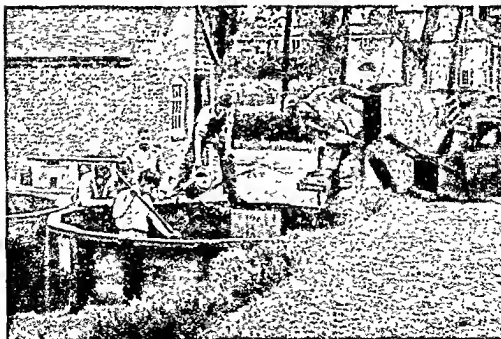
In recent years such experiments have multiplied. Co educational schools, schools where children were not compelled to play the regulation games, schools in which, to the horror of the orthodox, discipline is "free", schools where music and painting were regarded as of equal value to grammar, schools in which all kinds of strange arts and sciences such as architecture and printing, meteorology and genetics were regarded as a possible training for the young citizen, schools too in which a new and scientific interpretation of Greek, Latin and even Hebrew literature might be heard. New ventures of these kinds sprang up in different parts of England.

At the same time much larger masses of children have been affected by a revolution in technique—a revolution such as we have seen from other chapters in this book is now taking place in every field of activity. First of all come books, books no less for the teacher than for the pupil. Some are books like the *Outline of History*, *The Science of Life*, *Crowther's Social Relations of Science*, and *Hogben's Science for the Citizen*, which have replaced the



MODERN CULTURE

—an apprenticeship for real life—examples of technical training from 'Farm & School'.
Learning the points that make a good dairy cow



Making silage from lawn mowings



How about this way of learning arithmetic? Estimating weight and content in forestry lesson

romantic play of kings and heroes and the dismal study of unrelated and unreal facts by giving a picture of man's activity and knowledge against the background of his material needs. Others again are books such as *Farm and School*,¹ which show these material needs taking effect, and the practical arts of life such as the breeding of animals, the growing of plants, and the management of a farm, as a training for the mind as rigorous as any abstract learning and not less entertaining because their purpose and their use are obvious; or *The Englishman's Food*,² to take a more theoretical example. Such books have shown us all alike the different narrow subjects we learned at school no longer as so much dismantled machinery but as components capable of being built up into one powerful engine, the product of all man's ingenious efforts to master nature since the beginning of his history.

Next comes the cinema. None of us can fail to learn from the intelligent use of the film, to learn, that is, in the sense of coming to see the things around us from a new point of view. To the child this instruction is a godsend, for it opens up the possibilities of his own development in a way that books, and pictures, and talks, can never entirely succeed in doing. It adds a new dimension to the life of the mind.

Thirdly comes the wireless. By wireless these and others of the newest ideas of the best teachers of our time have been brought to the ears of the children, and of the teachers also, in the cle-

¹ Thomas & Vosey 1939 Longmans

² Drummond & Wilbraham 1939 Cape

mentary schools Geography can now be described to them by men who have used maps, and perhaps even made them, history and science by men who have made their discoveries, language by speech, and music and dancing with all the resources that voice and orchestra can offer With these resources teaching can become a mode of drama In this way, by an ironical accident, elementary school children have been receiving fresher and newer learning than their brothers and sisters (or should one say cousins?) in more expensive schools For here was an instrument so economical and convenient, but so powerful and easily controlled, that its use fell naturally into the hands of the central authorities

Fourthly comes the psychologists' test of intelligence as an aid to, or even as a substitute for, the examiner's test of training The inevitable weakness of any examination system is that its efficiency is limited by the intelligence of the teacher and of the examiner It was a realisation of this that led the University of Cambridge to abandon the practice of numbering its Wranglers in a precise order of excellence The later results too often exposed an error of judgment And outside mathematics, the effects of cramming and the success of mere verbal memory (itself an antidote to initiative) are still harder to exclude The use of the intelligence test on the other hand, although still in its infancy, has shown that future potentialities can be discovered and measured And, since these are often more important than past performances, we may expect the intelligence test to remove in the future one of the greatest bugbears of the teacher and the pupil alike

All these changes are bringing to education a force, a reality, and even a dramatic unity it never had before It is not surprising, therefore, that public authorities should everywhere be realising the vast new possibilities of education and the stimulus that has been given by these new methods to the emotional urge on the part of the people—not only children, but grown ups too—to satisfy their curiosity, to learn to do things with skill that had hitherto been picked up without skill, to recover the arts and crafts which were smothered by the Industrial Revolution and the intellectual starvation that followed it

Particularly is this true of the arts and crafts of women which in this country above all have suffered a terrible disintegration Here the realisation has sprung up that teaching cookery scientifically is perhaps as good a training for the mind as teaching languages and perhaps more necessary and more delightful for

a future housewife. An experiment in teaching mothercraft to girls, adopted by some London schools, may have the most far reaching effects. It has not yet shown whether they will make better mothers as a result. But it has made it extremely likely that they will have more children. For the squalor in which girls have seen their younger brothers and sisters brought up in the past was not the best means of increasing the birth rate. And it is a fact that there are women in all ranks of society who are terrified of motherhood simply because they do not understand their own anatomy.

Perhaps the greatest hope of all springs from the attack that is now being made on education in the country schools. It was here that contact between life and teaching was most easily lost. It was here that that contact was most sadly needed, and can now most easily be regained. Agriculture in this country requires for its recovery many bold enterprises, but above all it requires a cultural reinstatement of the workers on the land. It requires that they shall enjoy as thorough a technical training and as general an intellectual encouragement as the workers in the town.

The solution of this tremendous problem was the task which Henry Morris, the Cambridgeshire Director of Education, set himself. His method was to establish a new kind of educational centre. There was to be one for each group of villages. It was to combine the classrooms and workshops and playing fields of a senior elementary school with a library, meeting room, lecture and concert hall and canteen for the use of grown ups as well as of children.

Already four of these Village Colleges have been set up. They have been designed—especially the last established at Impington in 1939—without regard for the traditional forms or materials that were thought necessary for schools, but purely to meet the requirements of health and convenience in the best way that our modern knowledge can contrive. Large windows, simple lines, bright colours (even yellow blackboards) are bound at first to shock and then to delight those who remember the dark and solemn elaboration of old school architecture. The neat grass and well arranged trees seem too good to be true for those who remember the confined playgrounds, underground tunnels and dingy shrubs of the past.

Surely this is the right foundation for teaching. For how can a child be taught to love beauty when it never sees beauty except

in books? And scarcely even in books, for school books have rarely in the past been objects of good taste. And how can it wish to improve its own surroundings when it has never seen anything better? On the other hand, we may well ask, will a generation of children brought up in this way tolerate the wanton hideousness of our cities? It is scarcely likely. Bringing children into beautiful schools alone is therefore bound to set in movement a revolution in thought with consequences greater than all the argument in the world could contrive.

But perhaps the most revolutionary part of the Village College idea is the combination of the social and cultural life of the grown ups with that of the children. There, women as well as girls can learn cookery, men as well as boys can learn gardening, and neither the ornamental arts of music and drama, nor the useful sciences of chemistry and botany enjoy any snobbish or artificial precedence. The ordinary man and woman are merely given what they did not know they lacked—a full enjoyment of living.

Thus, instead of education being an unpleasant episode, happily terminated with childhood, it becomes a permanent recreation, a recognised emotional necessity for the individual and one whose satisfaction can make him a living part of the community. Indeed, oddly enough we see, in the light of this experiment, the yawning gap that was left by the destruction of the mediæval church at the Reformation. That gap has never been filled for the common man in this country. He has yearned for any kind of remedy and he has followed a multitude of quacks. The astrologer and the bookmaker have met his wants. Society has never recovered the integration, the organic unity, that it enjoyed in the Middle Ages. Now we see one way by which that unity can at least in part be restored.

At the present moment a new world outlook is opening out before us. In this new world a new education will be necessary. We find in these small scale experiments of the last twenty years the lines along which the new education can be laid. It will be the business of the Government to use these experiments in framing the systems of the future. If they tackle this job boldly they will be successful for the first time in solving the great problem of harnessing the emotions of the child to the duties of the citizen. On the solution of that problem the future of our people depends.

JOHN SUMMERSON

NEW GROUNDWORK OF ARCHITECTURE

What is behind the new building ideas, which may seem remarkable to many and are perhaps understood by few?

Hitler hates flat roofs. An increasingly unimportant fact, I admit, but a fact which stands for something. It stands for the bitter hatred of perverse and unteachable men for the new pattern of life which is everywhere emerging out of the old—to our imminent peril if we do not comprehend and direct it. This queer little phobia about roofs symbolises opposition to knowledge, a blind refusal to understand. Not that flat roofs are in themselves, either new or invariably essential to a liberal view of architecture; but it is characteristic of the Hitler mind to seize on a non-essential aspect of new thought and “make an example” of it, beating it up, chasing it round the town and finally knocking it into a cocked hat—or, more accurately in this case, a cocked roof. The truth about flat roofs is simple enough. In days when the only common roofing materials were timber, tiles and slates, it was convenient to introduce a slope to get rid of the rain as quickly as possible. But in an age accustomed to steel, concrete and asphalt, the pitched roof is no longer essential. Flat roofs are as good or better. There is nothing in this, surely, to rouse a Nazi's ire. Certainly not. But the trouble where Hitler is concerned is that the flat roof, the continuous horizontal window, the long unpillared span all coalesce under the sanction of a new philosophy of architecture, a philosophy identified with scientific thought, which is, in its very essence, anti-fascist and which Hitler intensely dislikes. (It is worth noting, by the way, that Mussolini, whose fascism failed to arrive at the Teutonic intensity of Hitler's, admitted modern architecture into his state. It is a bit of a misfit, but it is there.)

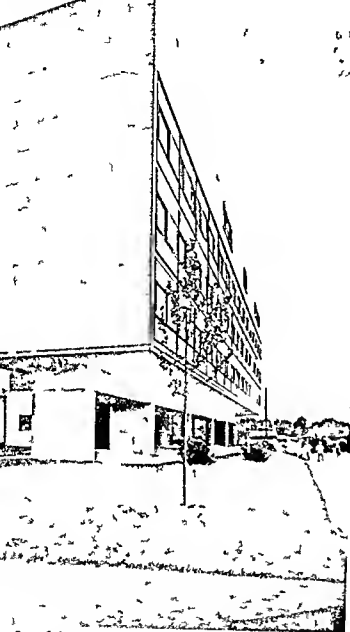
Architecture is going to be important in the modern world and I want to show in this article what is happening in present-day

building and what it is that the Hitler mind so very much dislikes. It is, I believe, in spite of Hitler, solid, unassailable and permanent. It knits up with the big things in thought and science and art which are the subject of other chapters in this book.

It is precisely because the change in the world outlook for architecture is so deep, so fundamental, that it is hard to explain it in a few words. If it were a matter of praising one "style" at the expense of another, of trying to prove that horizontal strip windows were nicer to look at than diamond panes, it would be easier. I could put up a case, and you could agree or not as you liked. Either way, it would not matter in the slightest. But what I am attempting is to give you an inkling of the complete change of standpoint which the latest phase of architecture involves. This is not easy, but it is important. Whether architecture in this country moves forward or stands still and rots, will depend very much on whether responsible men and women really understand what is happening, or whether they remain indifferent and uninformed.

I will begin by comparing two very different general conceptions of what architecture is—the old conception and the new. The old conception shows us an activity indissolubly married to the past. I believe for many people the word architecture is always coloured by antiquarianism. Architecture—old churches—fan-lights—styles—periods—ornaments. An architect is a man who knows all about these things and is able to select and adapt styles for modern purposes and to modern methods of construction. "This charming Queen Anne style mansion with all modern conveniences" represents the house agent's idea of what a capable architect should perform, and it is, I suppose, roughly the idea which the public accepts. And not only the public. Till quite recently architecture was taught as a combination of historical adaptation (the tasty part) and technology (the dull part). In some backward schools it still is. In such schools, the student is greatly concerned with the "interpretation" of the past. "Georgian with a modern flavour" is approved for domestic work, "free Gothic" for churches, and "a modern adaptation of Neo-grec" for commercial buildings, the "freedom" and "modernity" giving the necessary scope for the designer's initiative and self-esteem.

This loose bondage to the past is usually called "tradition". It is architectural Toryism. It is the Royal Academy point of



One of the most original and successful works of the great French-Swiss architect le Corbusier. The hostel for Swiss students in the University City at Paris, built chiefly of reinforced concrete and glass.

view. It is the line of least resistance, defended, like other Tory lines, by platitudes, catch phrases, and every form of easy lip service—everything but clear thought. And it goes hand in hand with the traditional idea of the architect's place in society—the idea of the artist as the genteel lackey of the wealthy, the man who turns surplus profits into picturesque country houses and imposing city façades. The typical architect of yesterday is the man who,

by a combination of skill, luck and assiduity builds up a "practice", erects a "Gothic" church or two, half a dozen "Georgian" houses, a "Tudor" pub and a "Classical" office block, and leaves behind him a modest fortune and a more or less respected name. There is nothing contemptible about this picture of an architect, but as I shall show in a moment, it is getting a little out of date—like the architecture which belongs to it.

Now for the new conception of architecture. I can best introduce it by telling you how it has come about. From time to time, during the past hundred years, men of independent and unusually perceptive minds have noticed a rift between "architecture" as taught and practised, and architecture as a way of making man's surroundings convenient, healthy and beautiful. Ruskin was one of the first to notice the rift and shout about it, but Ruskin lived too soon to get his bearings in the emerging world of science, and his discovery was lost in rhetorical and highly individualistic philosophising. A few men living about the time of Ruskin's death, however, saw things more clearly. I will not burden you with their names except in one case, that of Frank Lloyd Wright, the great American, whose name, honoured by architects the world over (except, I suppose, in Naziland), you probably know.

Wright in America, and other men in other countries, began to restate the meaning of architecture. They began to ask: what is architecture? What is its real basis? They put the answer in the broadest possible way, something like this. Architecture is the accurate application of man's universal knowledge to the problems of shelter and warmth, of healthy and convenient living, and knowledge in this context means, not merely knowledge of the practice of bricklaying, carpentry and plumbing, but of the whole scientific field—knowledge of new potentialities all along the line, from metallurgy to acoustics, and an accurate knowledge, too, of people's ways of life, how they are changing, and what the mass of people, individually and as a whole, really require of architecture. They saw architecture as the whole range of contemporary knowledge brought to bear on one contemporary problem.

This may sound a roundabout way of saying something obvious. It has always been the business of any architect at any time to bring knowledge to bear on the problem in hand and to solve it in a practical way. But the whole architectural scene had become terribly lopsided. Interest had come to centre in *results* rather than in *methods*, and results were always judged against the back-

ground of the past. Thus building types with a long tradition behind them, like churches, colleges, museums and great country-houses, always figured as the cream of architectural production, while hospitals, factories, elementary schools, public baths and mass housing were thought of as necessary but artistically uninteresting buildings which were only in a small degree susceptible of what was called "artistic treatment." There was, and to some extent still is, a line drawn between the cultured and artistic architect who deals in churches and colleges and town halls, and the common run of architect who makes a living out of dull but necessary things like working-class housing, factories and state schools. You have only to look round the deplorable assembly of miscellaneous drawings in the annual Royal Academy show to see how certain building types still retain their "snob value" and how others appear to have found their way in by the kind tolerance of the hanging committee.

The vision of the pioneers of the new movement in architecture has changed this prejudiced outlook. For them, the absorbing thing in architecture is not to produce striking results out of individual opportunities, but to consider the actual life of a healthy modern community, analyse, and discover the right architectural answers as part of the whole answer, without any preconceptions about how these results will look in the picture gallery of tradition.

This, you see, has nothing to do with the invention of a new brand of architecture, a "modern style." The departure is on a much more fundamental level. It is, if you like, the discovery of a new philosophy of architecture.

However, something very like a new style has resulted. When imagination becomes absorbed in methods rather than results, when traditional standards of comparison are relinquished, it is a clear consequence that the trimmings and symbols associated with tradition lose their meaning. Ornament goes. But that is not all. The "topsy-turveydom", which sends ornament to the bottom of the scale, brings other, forgotten, values to the top. The exciting part of the designer's work is now the actual spatial arrangement of the building, which is susceptible of infinite finesse. And it is no accident that this exclusive concern with spaces, proportions and mass dovetails exactly with the aims of modern "abstract" or "constructivist" painting. Ornament, then, is swept away like autumn leaves. Architecture becomes diagram-



CLAUDE MONET

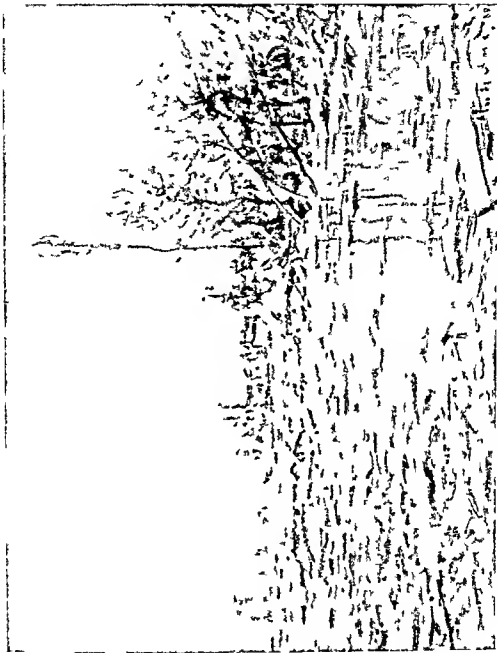
The Thaw 1880
Impressionist
Gulbenkian Collection
National Gallery London

ground of the past. Thus building-types with a long tradition behind them, like churches, colleges, museums and great country houses, always figured as the cream of architectural production, while hospitals, factories, elementary schools, public baths and mass housing were thought of as necessary but artistically uninteresting buildings which were only in a small degree susceptible of what was called "artistic treatment." There was, and to some extent still is, a line drawn between the cultured and artistic architect who deals in churches and colleges and town halls, and the common run of architect who makes a living out of dull but necessary things like working-class housing, factories and state schools. You have only to look round the deplorable assembly of miscellaneous drawings in the annual Royal Academy show to see how certain building types still retain their "snob value" and how others appear to have found their way in by the kind tolerance of the hanging committee.

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CLAUDE MONET

The Thaw 1880
Impress on st
Gu ben an Collection
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PAUL CEZANNE

Landscape with Rocks 1880
Post impressionist
Tate Gallery London



PAUL NASH

Monster Field 1939

Surrealist

Durban Permanent Collection

South Africa

PAUL CEZANNE

Landscape with Rocks 1890
Post-Impressionist
Tate Gallery London





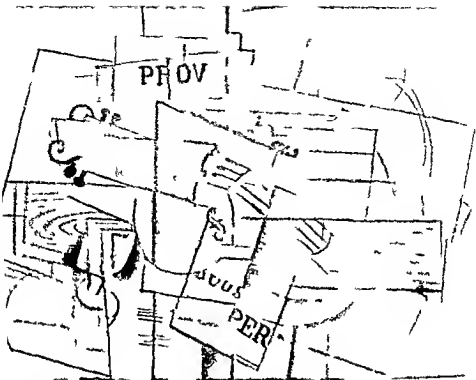
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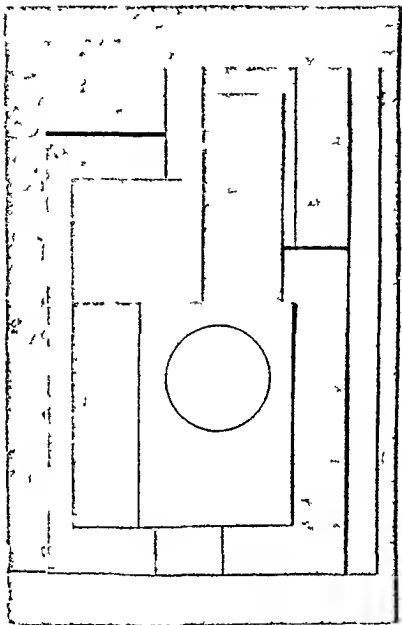
Du ban Pa ment Collection

South Af ca



GES BRAQUE

Mal n e 1913



BEN NICHOLSON

Painted Relief 1942

Constructivist



BARBARA HEPWORTH

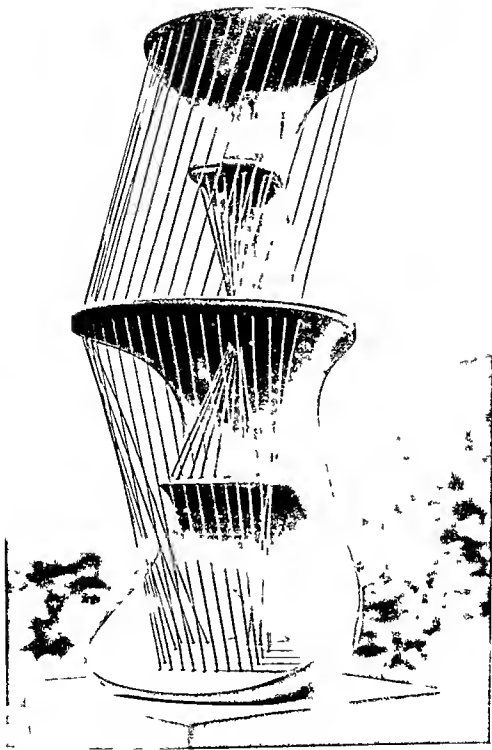
Perced Hemisphere

(marble) 1937

Constructivist

Wakefield City Art Gallery

(previously George Eumorfopoulos Collection)



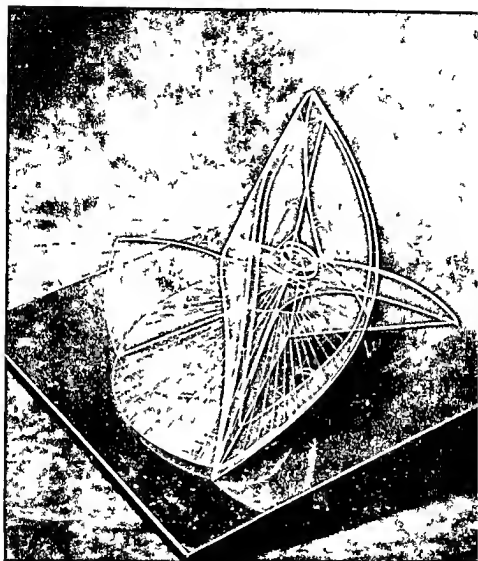
HENRY MOORE

The Bride

(Sculpture in lead and wire) 1940

Surrealist

E. L. T. Mesen's Collection



NAUM GABO

Spiral Theme 1941
Construction in Space
Constructivist



KENSAL HOUSE

There are no ornaments on this nursery school at Kensal House, but the unbroken curves, contrasting with the rectangular pattern of the flats beyond, make fine architecture. Designed by Maxwell Fry, in collaboration with other architects, and built of concrete and steel

matic. The artistic conception, the emotional zest, is in the very bones of the building, not in the "treatment" or "handling" of its façades.

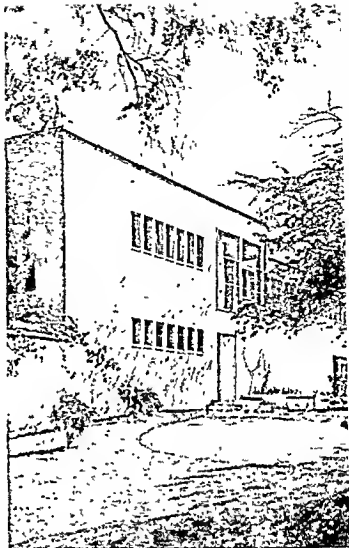
It is not always easy to bring home to the layman the qualities of a building designed by an architect with this new outlook. Just as the layman expects every painting to "represent" something, so he expects a building to stage an "effect", to have something complicated about it, some "features" on which he can consciously fasten his attention and pass an opinion. This is the result of habit, and of confusing the associative, historic beauties of architecture with the absolute beauties arising from the simplest structural forms and their precise and sensitive arrangement. The fundamental beauty of all architecture resides in the relation it bears to life and to the particular department of life for which it is designed. Much old architecture, with its rich and highly artificial ornamentation, may seem to belie this. But remember that these old buildings were designed for rich and highly artificial modes of life. Today we are, I hope, not inter-

ested in accumulating vast family fortunes and cresting them with expensive frills. Certainly we do not want to be artificial. Moreover, the great architecture of the past has often been the instrument and symbol of a class—the baron, the ecclesiastic or the great landlord, parading his consequence before his peers and before the people. The architecture of today must be the architecture not of a class but of the community itself. The need for parade vanishes. We are rediscovering architectural beauties deeper and subtler than any which the fourteenth or eighteenth centuries knew, but of which the Greeks had, perhaps, more than a glimpse.

At this point you may be asking yourself whether there is any difference between the outlook of the newer kind of architect and that of the engineer. The answer is that engineer and architect work in different regions of the same field. The engineer is a specialist in the calculated solution of structural problems. The architect is a specialist in what can only partly be calculated—the disposition of a building to suit the elastic needs of everyday life. Unfortunately, the misconceptions of yesterday are still preventing a real collaboration between the two professions. Far too many architects still think of the engineer as a subordinate who looks after obscure but necessary calculations; and far too many engineers think of architects as men who deal with the “pretty part” after the bones of the building have been fixed. Architects know too little about engineering. Engineers have (in my experience, any way) conventional and wholly unprogressive ideas about architecture.

Ideally, engineering and architecture should be engaged in a continuous give and take, each thoroughly alive to the potentialities of the other, and I know individual cases (all too few) where this is happening. Such enlightenment must spread. The engineer is out for one thing—performance; the task of getting the greatest strength with the least material. The architect is out to knit performance into that synthesis of qualities which makes the new architecture. Here is a combination of two kinds of vision, and I will try to indicate their nature more exactly. Compare the engineer's mind and the architect's. The engineer juggles with data and groups of data. In creative mood he

House at Chalfont St. Giles, by Serge Chermayeff and Mendelsohn. This photo shows the front of the house; on the other side facing the garden all the principal rooms have large windows



In a modern structure with its minimum of support points. Internal planning can be as free and easy as you like. Here is the architect's studio in a block of flats in Zurich designed by Roth and Breuer

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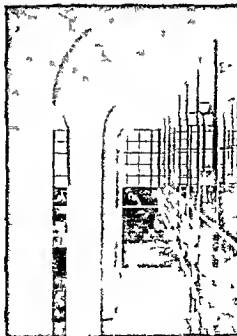
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BRIDGE IN SWITZERLAND—A contribution from the engineering side. The mind of Robert Maillart the great Swiss bridge builder elicits new beauties from the realm of calculation and construction.



PENSIONS BUILDINGS PRAGUE—A happy marriage between engineering and architecture, this work by a Czech architect is notable for its original structure and fine finish.



MUSHROOM COLUMNS—Mushroom® construction in reinforced concrete is an engineering device which rarely fails to please the eye. The interior of a department store in Holland.

which, combined with a certain arrangement of steel of a certain quality, will reach a new "high" in structural efficiency. Quite incidentally, his discovery may produce a new shape, a new proportion. Here his creative work touches the architect's. The architect is concerned not so much with structural data as with structural shapes and the way they can be used to produce the maximum order and efficiency in his planning. The light aerial quality of the new architecture, its luminosity and spaciousness, are due entirely to the pioneer architects' exploitation of what engineers have discovered. The engineers, for instance, discovered reinforced concrete construction, with its capacity for wide spans and small support points, its unending potentialities for flexibility of design. The earlier buildings in which reinforced concrete was used, however, showed not the slightest appreciation of the imaginative possibilities of the discovery. The wide spans were merely expedients fitted into a building of traditional character. It was left for men like Frank Lloyd Wright and (I cannot resist adding two more very great names) Auguste Perret and Le Corbusier to see that modern engineering was reaching out to join hands with the modern spirit in design, as manifested, for instance, by the abstract painters, and that a new architecture was ready to come into being.



I hope I have given you, in these few paragraphs, some idea of the great change which has come about in architecture, the new groundwork which has emerged and on which all hope of architectural progress must be based. To conclude, I will bring the matter down to the people and things around us here in England now and sketch the outlook for the new architecture, as it appears to me.

The architectural profession is, very naturally, a body in which all sorts of views, from the most conservative to the most radical, are represented. You will not find many architects over, say, forty-five who are more than speculatively interested in the new outlook. Among the over-fifties you will find plenty who are ruthlessly and irrationally opposed to it. It is the younger half of the profession which looks to this new philosophy of their art as to a rock of truth in a bewildering ocean of half-truths. During the ten years before the war the swing round among students and young architects was remarkable. Groups and societies were formed to discuss principles and possibilities. Soon it began to

This is the end of my article, and I have said nothing about individual buildings. I have pointed to no buildings which I think "good" buildings. This is deliberate. I do not believe in the kind of art criticism which assesses merits and awards adjectives. I am not interested in proving that a "modern" building is "more beautiful" than a "traditional" building (which it is not, necessarily). The buildings illustrated here I have chosen to show the kind of architecture which is emerging from the spread of new ideas among a large and important part of the profession. It is a kind of architecture capable of all the virtues and all the vices of other kinds of architecture. But the important thing is that it is symptomatic of a fundamentally reasonable and *scientific* conception of what all architecture should be—the orderly and harmonious application of man's knowledge of himself, of society, of nature, to the glorious task of building.

be noticeable that students in some of the schools were more interested in what they learnt through their own reading than what they learnt in the studios. The entries for certain prizes and scholarships whose conditions were framed in academic terms fell off rapidly. The students began to demand a training which taught them more about the conditions of their own time, and clung less closely to a narrow professional tradition. They discovered that engineering, sociology, and even psychology, were more relevant to architecture than elaborate draughtsmanship and the classical "orders"; and if enthusiasm sometimes outran statesmanship, there was no mistaking the earnestness and consistency with which the student world adopted its new standards.

At the same time (and I am speaking of the period abruptly interrupted by the present war) there began to be a new feeling towards conditions of architectural employment. The time-worn ambition to become one's own master, to have an office, a staff of draughtsmen, and a brass plate, dropped much of its prestige. There was talk of group work, of the re-organisation of the offices of State departments to provide better opportunities and better conditions of work. A few young men of exceptional ability were appointed to important official posts; others joined them and lively centres of endeavour and achievement sprang up in many parts of the country. The case of Coventry, where, after the great "blitz", it was revealed that D. E. E. Gibson, the City Architect, and his assistants had already been studying a great rebuilding plan for the City, is a fine example of the new spirit in the provinces. It seemed, and will, I believe, still seem, after the war, more exciting to the young architect to collaborate in the building of housing schemes and schools on a great scale than to potter about in one's own attic designing country cottages, hoping for a competition "break", and wondering where the typist's next week's salary is coming from.

These are some of the sign-posts of contemporary architecture in England. They seem to me to point to a future full of great things. But we shall not realise that future unless the wide-awake element among architects finds allies outside the profession—alleys among engineers, public administrators, teachers, doctors, men and women on councils and committees, and every Englishman who feels a responsible pride in the community to which he belongs.

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E H RAMSDEN

NEW TRENDS IN PAINTING AND
SCULPTURE*Modern art forms considered in relation to the past
and to the future*

Few great artists, as a modern French writer has pointed out, have escaped the reproach of obscurity from their contemporaries. But "the obscurity of a passage is the product of two factors—the thing read and the being who reads it. The latter rarely blames himself." It must be admitted at the outset, however, that the art of today is not "easy", though it is probably not more difficult to appreciate than that of any other period, since, in any case, the assumption that the theory and practice of art is a subject for amateurs dates only from the eighteenth century, when painting came to be regarded as a drawing room accomplishment, rather than as "an intellectual virtue" requiring the highest application for its pursuit. Yet, while it would be a mistake to perpetuate this fallacy, it may be said that if the subject is approached in a free and unbiased spirit, the theory of contemporary art will be found to be based upon wholly logical premises, a study of which will furnish more than the physie of its pains.

In the first place, the habit of looking at painting and sculpture with certain preconceived notions as to what art should or should not give and as to the way in which things should or should not be done is to be avoided, since it is inimical to the enjoyment of everything that fails to satisfy these demands. Also, in view of the inexhaustible variety of art forms, it would be foolish to suppose that there is only one way of doing things and only one set of standards to be observed. For instance, it never occurs to those familiar with Western art to question its method of using light and shade. Yet, when a European painter attempted to apply it when painting the portraits of the dignitaries of the

Chinese court, the Emperor Kang'hsi objected on the ground that the faces of the Chinese are not white on one side and black on the other. It therefore becomes obvious that in these matters everything depends upon the convention to which one has grown accustomed, and that to insist upon the observance of any one formula to the exclusion of all others, or to maintain that there is only one norm, is merely to expose one's own ignorance of the possibilities.

Secondly, it is important to remember that each phase of development within a given convention must be considered in relation to its time and place before it can be fully understood.

Thus, the art of today might well be looked upon as an anomaly if it were considered without reference to the scheme of things of which it is a part, but when it is recognised to be in accordance with the advancement of science and technique generally, the changes which it is undergoing, fundamental though they are, will be found to be as necessary as they are inevitable, for the art of a people remains vital only to the extent to which it corresponds to the thought and to the character of the age to which it belongs. So that just as in the past the waning of the power of the Church led to the decline of religious painting and to the rise of a secular art, so likewise has the progress of chemical research, the invention of the camera and the perfecting of the machine had an effect upon the work of the artist of modern times. For these reasons, and also because its aims and ideals are coincident with the whole trend of contemporary thought, the art of today may well be recognised to have undergone a change that is not more radical than that which has taken place, for example, in the generation of power, the change from wind and water power to steam, and from steam to electricity.

It has been said with truth that if one criticises painting for its verisimilitude, one's understanding is that of a child, since, generally speaking, it is not so much "what" is painted that matters, as the style and the manner and the quality of feeling with which it is executed. "Who told you that one paints with colours?" asked Chardin. "One makes use of colours, but one paints with the emotions"—a statement which may be said to indicate the comparative unimportance of subject matter, as such. From this, however, it is not to be supposed that "form" and "content" can, in fact, be separated, though for the purpose of the present argument this distinction may be made.

Without going back to prehistoric art, which most people would find as difficult to understand as the most modern phases, it may be useful to consider what the painter chooses to paint and why. For although in some cases the reasons for his choice may be fairly obvious, in others they are less so.

As may be seen in the work of the Primitives in all the great schools of art in Europe, the original impulse in art was a religious one, and one which continued to dominate the creative imagination for several centuries. With a growing command of technical resources, however, and an increasing elaboration of the idea, the spirituality of the early masters gradually gave place to a more worldly conception of things, and art degenerated from the purity of a Fra Angelico to the banalities of the Carracci. It was therefore inevitable at this stage that painters should have turned from the sacred to the profane, from the symbolical to the representational, and should have sought in new forms the expression of essential worth.

For this reason, from the time of the Renaissance onward the subject interest in art was concentrated upon classical subjects upon allegory, portraiture, landscape and still life, subjects which, under the patronage of kings and princes, lent themselves to treatment in the grand manner, a manner which persisted until the decline of the independent Republics in Italy, and the outbreak of the Revolution in France. In the Low Countries, on the other hand, where even religious painting was characterised by a certain simplicity, the subjects which chiefly interested the Flemish and in particular the Dutch masters, were the ordinary scenes of life as it was lived, not in palaces, but in the taverns and in the homes of the people, and it was these scenes that later came to attract the Impressionists, though in approach, in treatment and in spirit their work was entirely different. Nor could it have been otherwise, since changing times, changing manners and changing ways of life must necessarily lead to changing forms and changing styles of art, though perhaps after all Gertrude Stein is right when she says that nothing, in fact, changes except our way of seeing things, and that it is its way of seeing things that characterises each generation.

However this may be, the Impressionists, with whom the modern school begins, both in their choice of subject and in the handling of their material manifested a spirit that was in keeping not only with the social, but also with the scientific bias of their time.

Thus, in their delineation of the common everyday things of life, in which they discovered a new interest and a new excitement, it was no longer the accurate rendering of objects, of their colour and texture, as in the case of the genre painters, that preoccupied them, but the realisation of their more vibrant qualities. That is to say, it was the *wind* in the trees, rather than the trees themselves that was felt to be important, the *vibration* of the sunlight, the *atmosphere* of the café and the law court, the *movement* of the dancers and the *pose* of figures engaged in every kind of occupation. But if the focus of attention had changed from the remote to the immediate and from the static to the dynamic, this was due not only to the fundamental change that had taken place in the mode of thought generally, but also to the scientific progress of the age, for it is noteworthy that the successes of the Impressionists depended no less upon the enrichment of their resources through Chevreul's researches in colour than upon the brilliance of their own artistic innovations.

For purposes of classification the plastic arts from the time of the Post Impressionists may be said to follow two distinct lines of development—one being a revival, though in an altered form, of something that had always existed in art, and the other a logical outcome of the main tradition.

Surrealism, which represents the first, is not, however, a movement that finds expression only in the visual arts, since, constituting, as it does, an attempt to penetrate to the sources of poetic inspiration in the subconscious mind, it lends itself to equal use (and sometimes misuse) in literature. From comparatively early times there has always been a tendency both in poetry and in painting to forsake the rational for the supersensible in order to present, as it were in a single image, the diverse elements of an experience that corresponds not to the truth of the visible world but to that of the unseen world of the emotions. But this type of imaginative art, which has reached its most complete expression in the Surrealism of modern times, represents only one aspect of the movement. The other is analytical and disruptive and is concerned with psychological rather than artistic problems, for as Auden himself has shown, Freud's influence upon modern poets, and, presumably, upon painters as well, has been paramount, though whether or not it will remain decisive for the future is questionable. In any case, the exponents of both types are equally absorbed in the process described as "laying the images" of the

subconscious, believing as they do in the superiority of such images over those of conscious experience. By this method they seek to provide a release from the fetters of everyday life with all its accepted associations and to make a way of escape into a world more closely related to the incoherent world of dreams, in which things are stripped of their conventional appearances and take on sometimes more fantastic and sometimes more simplified forms than those under which they are ordinarily perceived. For this reason it is useless to expect to find in Surrealism an ordered and a rational beauty in no way differing from that of the Schools and of movements derived from a different tradition, since it imposes its own conditions of enjoyment which must be accepted before its peculiar quality can be understood and appreciated.

The other line of development, which in one way provides a counter movement to Surrealism, is derived through Cubism from Post-Impressionism and has issued in the new Constructivism of today—a form of art that finds expression in works that are *composed* in a higher and more abstract sense than ever before.

As has been said, the immediate precursor of Cubism is to be found in the work of the Post-Impressionists and notably in that of Cézanne, who, by the re-introduction of an emphasised line, sought to restore a sense of structure to painting that had been lost in the "atmospheric" effects of the Impressionists. By degrees, however, painters became more and more absorbed in this question of structure, until in time they came to regard the geometric basis of objects as more interesting and more important than the objects themselves, so that through a gradual process of elimination, even the semblance of the objects on which their compositions were based became merged into an abstract harmony of lines and planes intersecting and repeating one another in patterns of endless variety that were more akin to the involutions and evolutions of certain musical forms than to anything else. Yet in spite of its inherent possibilities, or rather perhaps because of them, Cubism, like all vital movements, led before very long to the consideration of new problems, problems of relationship, tension and dynamic equilibrium, for example, which are the main preoccupation of the Constructivist school, of which Cubism was the immediate forerunner.

But before discussing this movement, it is necessary to return for a moment to the question of "content" in art. Now it is arguable that the interest and decorative value of wine bottles and

bread is comparatively slight and therefore that the merit of a Still-Life based on these motifs, as for instance of a Chardin, must lie in something else. In other words, it is not because of its subject matter that it is valuable, though its elements gain in intensity by being seen in isolation, but rather because of its colour and composition and because of the passion with which it is painted, in short, it is because of its *form* that it exists as a work of art. It therefore becomes apparent that subject matter as such is only a secondary consideration, and once this fact has been recognised, it is not difficult to follow the process whereby the abstract forms of the Cubists came to be substituted for the naturalistic forms of their predecessors, and that in turn whereby their "closed" geometric shapes gave place to the "open" purely *constructive* elements of the new school.

With the attainment of this stage a climax of considerable importance is reached, since both painting and sculpture which, when confined to the representational, tended to become increasingly sterile and restricted, have today been liberated in a new and unexpected way, so that there are perhaps no bounds to their possible achievements. But because of the apparent ease and economy of Constructivist methods, it must not be supposed that the problems of the painter and the sculptor are in any way simplified, on the contrary, because of their incommensurable character they are heightened, and, like the problems of science which defy precise definition in ordinary terms, require for their solution an intuitive genius and a practical faculty that have seldom been surpassed.

From all this it becomes evident that in the course of its history art has followed a line of development that is as exciting as it is inevitable, and that its possibilities are as great today as they have ever been is borne out not only by the essential vitality of its forms but also by the fact that these are adapted to the thought of the present age, with its changed conceptions of time and space and its calculation of the imperceptibles.

But while there is, it seems, no disputing the claims of science, there is a general disinclination to accept the new principles of art, despite the fact that it is just because they have contributed something original and something vital to the art of their period, which could not have been expressed in any other way, that the leading Surrealists and Constructionists must be counted among the great artists of their period. For as Ben Nicholson has said,

"painting and religious experience are the same thing. It is a question of the perpetual motion of a right idea." But while many things change in this infinitely various world, one thing, it seems, does not change, and that is the attitude of contemporary opinion towards the art of its time, though it is difficult to believe today that a work, which at the time of its first performance was described as "dangerously immoral", was none other than Beethoven's *Eroica* Symphony. But if, on this account, the artist of today need not be discouraged, neither need the beholder, if he will set aside his prejudices and believe that art (properly so called) is still as much an expression of faith as it was in the beginning.

KATHLEEN RAINE

LITERATURE IN THE MODERN WORLD

Modern authors are in tune with the age, and what seems odd today will be accepted tomorrow

Words have many uses. They can be a shorthand for listing the objects in the world—currants, raisins, tea, sugar. This precise listing of the material universe and its properties is the ordinary man's language. It is also the basis of what is called scientific terminology. The ordinary man's grammar is in fact based on the current scientific assumptions about the nature of the world. Sentences are orderly arrangements of words that show relationships of pieces of the real world to each other. Grammar takes for granted, in fact, the human experience of time and space, cause and effect.

Throughout his history, man has built up language in accordance with his experience of the world, and beliefs about it. He has named objects (nouns), defined their behaviour (verbs) and their properties (adjectives, adverbs and so on).

Man has made language, but language itself imposes on people a particular way of looking at the things in the world. It is true to say that no language can be translated exactly into any other. Language is a kind of lens through which the Englishman sees an English world, the Frenchman a French world, the German a German world, the African sees a magic, the physicist a scientific world. We do not all live in the same world, or see the same things. Each of us sees in terms of his own particular language. The recent advances of scientific discovery have presented a picture of things that differ greatly from any known to the past. C. H. Waddington, as a biologist, in Chapter 4, speaks of man as if he had just been discovered—and in Waddington's limited terms, man literally has just been discovered. But for a student of language or literature, it would be impossible to sweep away

the foundations of the past, on which the present rests. Scientific method is really a new technique, that bears less relation to past knowledge than can ever be possible for literature or painting. Architecture and engineering are profoundly and immediately affected by the new materials and new technique put at their disposal by science. But not all branches of human knowledge move at the same speed, nor do they need to. A poem can last longer than most buildings. Greek cities survive as beautiful ruins, when men no longer live in them. But Greek poetry, drama, and philosophy is not, in this sense, a ruin. Men still can, and do, live in the world of Greek philosophy and Greek poetry. The story of Troy still is as much a poem as it ever was, and Aristotle's logic continues to frame modern thought. In the words of the French poet, Louis Aragon, "ce sont toujours le temps d'Homere."

It is this longevity of literature that puts it in a different relationship to this rapidly changing world, from the sciences—the spear point of the advance of knowledge,—or the decorative arts, that belong primarily to their own time and place. One essential function of language is to conserve ideas in a lasting form. In our own English, we preserve, literally, the worlds of Chaucer, Shakespeare, Milton, the eighteenth century, the nineteenth, and traces of even earlier times. Latin, French and Anglo Saxon word forms retain for us a condensation of the whole history of our ancestors.

This idea was developed by the Italian philosopher Vico. He first pointed out that myths are a condensation of history. They are history in process of becoming poetry. Not the facts in summary, but the quality and meaning of events, are retained in myths at the expense of dates, statistics, and facts that might have a scientific value. But in the mythologies of all countries, alike yet different, clinging to a detail for centuries—a white bull, or a golden apple—while allowing those centuries themselves to be forgotten, the spirit of civilisation is at work. Men select what they need, and leave the rest. And this world of the past is retained in the present in the words, and above all in the poetry, of a language.

Language changes with the world. New objects, new inventions must be named. Buses, trains, bicycles, cinemas, electrons, genes, chromosomes, ether—take the place of the hansom cabs and chariots of the past and the terminology of alchemy and astrology. But it is not enough to add or discard a word here and there. The entire landscape changes as completely with time, as it does from place to place. Try to transpose Wordsworth's nature

poetry into an African jungle, or the Arctic. Not only do "the untrodden ways beside the springs of Dove" belong inevitably to a temperate climate, but so does the philosophy of Nature as a gentle and beneficent teacher of virtue. Nor can we add some elements to the landscape of Wordsworth or Shakespeare or Chaucer, without altering the entire scene. A pylon or a train changes, by its presence, the whole landscape. A forest becomes smaller and less wild when a railway track runs through it. The solitude of Mediaeval hermits and castles would be destroyed *in toto* by the introduction of wireless sets. Not only the trains and the wireless sets would be new, but the whole pattern of the existing world would be altered by the fact of their presence.

We can, as Keats put it, "travel in the realms of gold", we may prefer other realms (Shakespeare's, or Dryden's, or Tennyson's) to our own. But what we cannot claim, is that it is possible to live in the modern world entirely in terms of Shakespeare, or Dryden, or Tennyson, though it is just as true that we would be limiting ourselves if we were to pretend that *King Lear*, *Hamlet*, Dante's *Divine Comedy*, and Balzac's *Human Comedy*, belong only to the past. Much of our experience finds its expression in the language of Shakespeare, but much also does not. The feudal hierarchy and its offices—kings, nobility, merchants—have no more place in our world than have the weapons of Henry V's infantry, or the barge of Cleopatra. Men themselves are different, in so far as their lives and functions are different. And those differences have to be understood, and incorporated into the world of literature, the structure of civilisation. The literary present covers many centuries, but must also include our own.

All this is by way of preparing the ground for the discussion upon which this article bears—literature in the modern world. Again and again people ask the question "Why is modern literature obscure? Why is modern poetry so difficult to understand?" I hope that I have already partly answered this question. Although primarily words come into being to describe the world, it also follows that we see the world in terms of the words we have. If we have no word for an experience, either we must invent one, or discount the experience, banish it from our minds. If we have no language, no poetry, for pylons, factories, the world of modern physics, or of the dream world of the unconscious mind, we try to exclude these objects from our experience. We say we "do not like" factories, pylons, etc., we would like to abolish them from

the landscape, and restore the countryside for which we have a language Wordsworth's rural England is not dear to us only for its beauty, but because Wordsworth has given us terms in which to understand it Language gives a kind of mastery over things Not being able to put something into words is a frustration, a kind of suffering

Wordsworth in his time was regarded as an outrageous modern The common speech, and simple country people of the North of England were not, a century ago, allowed as proper themes for poetry For us, Simon Lee and Peter Bell are taken for granted But when in 1922 T S Eliot wrote

"They are rattling breakfast plates in basement kitchens,
And along the trampled edges of the street
I am aware of the damp souls of housemaids
Sprouting despondently at area gates"

the public was outraged Such a landscape, it was said, is not "poetic" Precisely That is why it is necessary to make it so Eliot has given the years 1910 to 1930 a landscape He has made our London memorable, given it to the future

"And all along the Strand, up Queen Victoria Street,
O City city, I can sometimes hear
Beside a public bar in Lower Thames Street,
The pleasant whining of a mandoline
And a clatter and a chatter from within
Where fishermen lounge at noon where the walls
Of Magnus Martyr hold
Inexplicable splendour of Ionian white and gold"



Now that the walls of Magnus Martyr stand wrecked, like those of many other London churches, we are more aware, perhaps, of the London of "The Waste Land" that Eliot has salvaged in his poem for future centuries Eliot, the most revolutionary of recent poets, is deeply traditional In continuing a tradition, he has been called revolutionary, and has in fact been so Respect for the achieve-

ments of the past is best shown in the making of something entirely new and belonging to the present; as the works of the past belonged to their present, and were entirely new. Picasso is comparable to Leonardo, because he too is a great painter. A painter of replicas of Leonardo would not be a great painter, still less would he be like that great experimenter and innovator. And yet there are many people who want replicas.



T S ELIOT

They say "This is not my idea of a painting", or "This poem is not beautiful", meaning in fact "This poem (or painting) is not a replica of another poem or painting that I have already understood and liked".

There is a deceptive half-truth in many people's minds about poetry. Poetry, it is said, ought to be "beautiful"; and therefore things that are ugly—like Eliot's area gates, W. H. Auden's landscape of industrial depression, and the less romantic aspects of death and sex, should be excluded from literature. Great art possesses beauty—true; but this is so because great art makes things beautiful, not because it makes mention only of beautiful things. The armies and bloodshed of Homer are not things in themselves beautiful. Nor are the circles of Dante's hell, nor the streets of James Joyce's Dublin. It is the genius of the poet to give these things their glory. Indeed, the more painful and unacceptable an experience is, the greater our need to assimilate it through art. This, truly understood, is the process of civilisation itself.

An ordinary man, seeing a pylon in a piece of familiar landscape, is aware of an unwelcome change in his world. The presence of the pylon makes the trees, the fields, the flowers themselves, look different. He is looking at a new scene, and he must find new terms in which to understand it. The terms of the nineteenth century, or the eighteenth, no longer quite explain the world, and the discrepancy between the world of reality and the world of



CHARLES MADGE

language is bound, sooner or later, to become painful. Man never will live by bread alone, but by words—"By catch-words" George Bernard Shaw said—but that is malnutrition. The question is, do we read for pleasure, or from necessity? Both approaches to the arts exist, and have always done so, nor is there any reason to condemn the former as morally wrong. But, pleasant as pleasure may be, it is not the thing that human beings want most, or first. Before enjoying life it is first necessary to live. I speak now of the

life of the spirit rather than of the body, though that too is an essential prerequisite of enjoyment of the arts or anything else. If this is another way of saying that to enjoy this kind of art is the luxury of a leisured class, it is not to condemn it. It is to be hoped that there will be leisure and peace of mind for the enjoyment of the arts in future states of society, as there has sometimes been in the past—in those periods that produced Baroque architecture, Restoration comedy, Italian Opera, the painting of Claude, Watteau, Fragonard. Perhaps such moments of real or apparent security will always be brief.

However that may be, the period between the last war and the present one was characterised by a general rejection of sensuous beauty for its own sake. Lawrence, early Eliot, the American Imagists, the French and Belgian Surrealists, and the Auden school of poetry in this country, tended to select images and language that were beautiful only when raised to an incandescence of poetic feeling; an imagery and language composed of neutral or even ugly elements rather than those in themselves beautiful. Eliot's *Waste Land* is the outstanding poem of that period.

"What are the roots that clutch, what branches grow
Out of this stony rubbish? Son of man,
You cannot say, or guess, for you know only
A heap of broken images, where the sun beats."

The goal might be beauty, but the starting point was, rather, everything that was not beautiful—stony rubbish and broken images. An outcry from the critics condemned such poets for their lack of any sense of beauty. Edith Sitwell herself practised as a poet—in such poems as *Gold Coast Customs*—the very rejection of sensuous beauty that as a critic she never wholly accepted.

Why did poets make ugliness rather than beauty their starting point? They rejected beautiful imagery not from any lack of sensibility. Rather the reverse.

To contemplate sensuous beauty in moods of mental stress and conflict and sorrow, is unbearably painful. In a tormented age, art has to transform the obsessive ugliness, not to offer a mirage of pleasure to suffering men. If art fails to solve their suffering, men instinctively turn away from a deep and insoluble experience, to simple dope. Jazz and swing music are the typical expression of unsolved unhappiness.

The necessity to heal the wounds of life by raising ugliness that has somehow to be endured, to the state of beauty, is as old as poetry. Can any more terrible images be imagined than those of the battlefields and slaughter of Homer? Humanity, then as now the victim of senseless war, needed Homer's poetry in process of recovery. Tragedy recurs again and again as the theme of all art; the Christian art of Christ crucified; Greek tragedy, Shakespeare, Dostoevski; Rilke's poetry of death, so terribly akin to the false mysticism with which the Nazi soldiers are driven in herds to the battlefields.

Yet it is true that nothing is more profound than the serene beauty of Greek sculpture; of Raphael and Botticelli; the music of Mozart; the poetry of Spenser. This may be the highest of all art, the art of people healed and in their right minds. Such profound beauty lies deeper perhaps than the tragic interpretation of life; and, in history, has appeared in art only a few times, and that at the end of some long struggle with tragedy. Greek sculp-



D H LAWRENCE



JAMES JOYCE

ture came later than Homer and the tragedians. Late Renaissance paintings emerged into sensuous beauty after a long and intense learning of the harder truths of art and life, throughout the Gothic middle ages. Only in his latest play did Shakespeare rise from the darkness of his tragedies, into the light of *The Tempest*.

The landscape of the modern world is the least of the profound changes that have come about

during this century. Eliot, and more recently Auden, among poets, and D. H. Lawrence also as a novelist, have best expressed this change. Auden is the first outstandingly good satirical poet that we have had in this country for a long time.

"Consider this and in our time
As the hawk sees it or the helmeted airman
The clouds rift suddenly—look there
A cigarette end smouldering on a border
At the first garden party of the year
Pass on, admire the view of the massif
Through plate glass windows of the Sport Hotel,
Join there the insufficient units
Dangerous, easy, in furs, in uniform
And constellated at reserved tables
Supplied with feelings by an efficient band
Relayed elsewhere to farmers and their dogs
Sitting in kitchens in the stormy fens"

This passage, chosen at random, is a fair sample of Auden's picture. He offers us simultaneously a landscape (clouds, a cigarette-end in a garden, the plate-glass window of the Sport Hotel, music, a wireless-set, a farm kitchen) and its people (the airman, people in furs and uniform, "supplied with feelings by an efficient band", a farmer listening to the wireless). It is a world so familiar to us that we hardly notice it; the world of news-reels and "documentary" films, about which we are customarily either tough, or sentimental, but since war has made it dangerous, we have become

correspondingly serious. Auden himself, during the past ten years, has been in turn tough, sentimental and serious. It is sometimes difficult to see whether it is love or hate that drives Auden to describe with a clarity that is often itself destructive of what it creates. Really Auden's ambiguity is simply man's deep attachment to life, that is by both love and hate. *Odi et amo* is the cry of one who is very much alive. A satirist is one who loves and hates, not one who only hates.

Our modern psychologists have brought to our notice the fact that large tracts of the mind are occupied with mental processes to which the concepts of time and space (upon which, as I mentioned at the beginning of this article, our grammar is founded) do not apply. This more than any other change in the modern world has changed modern literature. James Joyce has written two books of major importance, *Ulysses* and *Finnegan's Wake*, that use words in a way that has never before been attempted; Joyce breaks away from what one may call the grammar of objects, the syntax of the sentence, based on the logic of the material world—cause and effect, past, present and future, sequence of events in space and time. He has ventured to dispense with the sentence so conceived, in his so-called "interior monologue", in which the ideas and images of the mind do not bear this grammatical relationship to each other. Everyone has a region of interior monologue, in which ideas are related in a free way, by causes and effects that do not operate in the outer world.

The discovery that the private thoughts are more erotic than public behaviour earned for James Joyce (no less than it did for Freud) a reputation for indecency. There are those who think Joyce is less likely to damage public morals (his standard of reference is the Catholic conception of humanity) than amateurs in ethics like the Communists and the Nazis with their various brands of vanity and deception, based on false premises than Joyce's. Here at all events is a sample of Mrs. Molly Bloom's thoughts before she falls asleep. The interior monologue wherein thoughts succeed each other inconsequently and freely is well known to all of us, and there is little difficulty in understanding



WILLIAM EMPSON

such a passage as this (taken at random from a soliloquy that occupies many pages)

"that train again weeping tone once in the dear deadead days beyond recall close my eyes breath my lips forward kiss sad look eyes open piano ere oer the world the mists began I hate that istbeg comes loves sweet ssoooooooooooooooooong Ill let that out full when I get in front of the foot lights again Kathleen Kearney and her lot of squealers Miss This Miss That Miss Theother lot of sparrowfarts skitting around talking about politics they know as much about as my backside anything in the world to make themselves someway interesting Irish homemade beauties soldiers daughter am I ay and whose are you boot makers and publicans I beg your pardon coach I thought you were a wheelbarrow theyd die down dead off their feet if ever they got a chance of walking down the Alameda on an officers arm like me on the bandnight my eyes flash my bust that they havent passion God help their poor head I knew more about men and life when I was 15 than theyll all know at 50 they dont know how to sing a song like that Gardner said no man could look at my mouth and teeth smiling like that and not think of it I was afraid he mightnt like my accent first he so English all father left me in spite of his stamps Ive my mothers eyes and figure anyhow he always said theyre so snotty about themselves some of those cads he wasnt a bit like that he was dead gone on my lips let them get a husband first thats fit to be looked at and a daughtler like mine or see if they can excite a swell with money that can pick and choose whoever he wants like Boylan to do it 4 or 5 times locked in eachothers arms or the voice either I could have been a prima donna only I married him"

Objects in the mind are not the same as objects in space and time, nor do they obey the same laws. The mind can think of a blue orange, a phoenix, or simultaneously of things far apart, and may have good reason to do so. The workings of the unconscious mind, or of Joyce's interior monologue, are not mad or lawless. The regions of the mind have their own laws, their own cause and effect. Shakespeare used puns scarcely less than Joyce, and for the same reason, not in order (as a rule) to be funny, but to enrich meaning, to break down the barriers between words, in order to liberate fresh meaning, for in the mind things can happen that in the material world are impossible. Joyce's immense knowledge of languages and literature, no less than his innovations, render him a difficult writer, but his effect is tremendous, even on those who have only read and understood a little of his work. Here is an example of Joyce's later style. Not only the syntax but the words themselves are recombined in a way that recalls the way in which cubist painters dismembered and reassembled objects.

"Eins within a space and wearywide space is wast ere wohnd a Mookse The onesomeness wast alltolonely, archunsitslike, broady oval, and a Mookse he would a walking go (My hood ' cries Antony Romeo) so one grandsumer evening, after a great morning and his good supper of gammon and spittish, having flabelled his eyes, pilloled his nostrils, vacticanated his ears and palliumed his throats, he put on his impermeable, seized his impugnable, harped on his crown and stepped out of his immobile *De Rure Albo* (socolled becauld it was chalkfull of masterplasters and had borgeously letout gardens strown with cascadas, pintacostecas, horthoducts and currycombs), and set off from Luds town a *spasso* to see how badness was badness in the weirdest of all pensible ways "

Finnegan's Wake occupied James Joyce for sixteen years. It is improbable that we will absorb it in a less time than Joyce spent on its composition. But that *Finnegan's Wake* will, in a longer or shorter time, prove a source of infinite refreshment to our language, is beyond all doubt.

Surrealism was a movement, rather of painting than of literature, that made use of many of Freud's conceptions. The idea was dynamie, and if it produced no single outstanding poet—with the possible exception of Paul Éluard—it has influenced writers of this generation.

There is no reason why modern science, in its wider implications, should be understood only by specialists. For the present it remains true that for any one man to be familiar with the whole body of present knowledge is almost impossible. During many centuries, acquaintance with a limited Latin and Greek literature, and the few civilised countries of Western Europe, was the common heritage of all men of learning. Education at present is far too specialised. A poet like William Empson, who is allusive to a great many branches of knowledge, including science, is obscure, because very few people share his kind of education. Gray was a no less learned poet, but he lived at a time of stability, and the standards of learning were generally accepted. It is to be hoped that a new canon of knowledge, including knowledge of the sciences, will stabilise itself, and form a new basis for standards of culture. When this happens, there will be less "obscurity" in modern poetry.

Not least of modern changes is the economic change in the world. Kings now are less powerful than masses. The romantic poets of the nineteenth century wrote in terms of the private emotions of private individuals. But Freud's psychology has destroyed in us the illusion that we know even what we call ourselves. Joyce,

greatest romantic of all, gives to the picture of a person, or a self, a meaning so unlike the familiar one, that we are as strange in the inner world, of our own minds, as in the outer one of modern physics. There is some evidence, in poets like Charles Madge, of a new feeling about man's place in the world, that takes into account our baffling multitude.

A pioneer of this kind of poetry is Mayakovski, the Russian writer who threw in his lot with the cause of the Communist Revolution. Even in the few poems available in English translation we feel that there is a strong simplicity about this poet. Mayakovski described himself in one poem as "a cloud in trousers"—the Russian word means workman's trousers. The cloud is that feeling, sensitive humanity, that lives under every human skin, however humble. This generous humanity is more Russian than Communist—one finds it at its best in Dostoevski, for whose Christianity all men are wonderful, however many of them there may be.

Mayakovski wrote—so a Russian who knew him tells me—in the common speech of Russia, but not in dialect, or in slang, because in the Russian language, as in the Scottish language of Burns, such a hard and fast distinction does not exist. Unfortunately for us, there is "good" and "bad" English. The language is divided by class distinction. In Ireland, where the speech of the people has not been debased, it is easier to be a poet than here, where the language has been severed from its roots, the speech of ordinary men. And so it is in Russia. The tragedy is that, once men have lost the speech of their fathers, it is hard to graft language again to the severed roots. Without wishing to take a pessimistic view of the future of English literature, I believe that we are in great danger of allowing this to happen. The fourth commandment has been broken too often, and in losing our roots in the land, we are losing, also, our poetry, our language. In this connection I should like also to mention Rainer Maria Rilke, who, though he wrote in German, preferred to live in France, and travelled all over Europe. There exist good English translations of his poems. Rilke was the poet of the anonymous man, the European citizen of any capital, the man in the street. He is a profound poet, possessing in a high degree the Germanic mysticism, not least the mysticism of death. No modern poet, certainly, has written of death as profoundly as Rilke.

In the present writer's opinion, there is likely to be much religious

poetry written for some time to come. The tendency is found in late Yeats, Eliot, and Lawrence, to re-establish a myth (Buddhist in Yeats, Christian in Eliot, and less defined in Rilke) that will be true for many men, or all men. Romantic individualism at least is doomed. Freud's picture of the inner world of the unconscious destroys at one extreme the individualist's conception of himself. At the other extreme economic changes make us increasingly dependent on each other. Modern architecture, for instance, tends increasingly to be the work of a group of technicians, building not for single individuals but for groups of people. Works of literature must always be the work of one mind, but language is, more than any other medium, the currency of a whole society, and the product of all branches of its thought.



RAINER MARIA RILKE

It may be objected that I mention only one writer (Charles Madge) who is under thirty, and that most of my quotations are ten or twenty years old. The works I mention will none the less be new to many readers, and are all still important at this moment. This is not, however, my reason for not mentioning more recent names. In my opinion there is at present a lull in literature, after a very vital period including Eliot, Yeats, Joyce and Auden. I attach no special significance to the fact that no outstanding prose (Lawrence Durrell is a poor echo of Joyce) or verse (though there is a positive whispering gallery of echoes) has recently appeared. All the best writers in England—with rare exceptions—are fully occupied in war-jobs. In their absence, a number of mice are making hay. No young poet has emerged who is worth very much praise, or even very much blame. Never, perhaps, have we had a poorer batch of young poets. Some may develop later, but none speaks for this moment of English history. There are no poets under forty-five, at present, as good as those over forty-five. Eliot, Edith Sitwell, Robert Graves come to my mind. There are others.

Two names, however, I would like to add—the names of two

ERIC BLOM

TWENTIETH-CENTURY MUSIC

Is modern music difficult?

In the thirteenth chapter in this book Edward Glover has shown the difficulties that meet the plain man in the field of modern psychology, and in the fifth J. G. Crowther has explained what it is that makes astronomy so baffling nowadays, even to minds well trained in nineteenth-century schooling. Much the same kind of perplexity arises in the case of a good deal of present-day music, to say nothing of the other arts, which have been dealt with in other chapters by well-accredited authorities.

What are the problems that face the listener who is anxious to pay some attention to what is going on in musical composition in a dozen or more countries today?

The main problem for the hearer is, no doubt, that he is asked to accustom himself to new idioms while he continues to live, quite rightly, with the masterpieces of the classics and romantics, especially now that they are always at hand either on the wireless or in gramophone records. This cannot be helped, nor do we want to help it, for the new music certainly must not utterly isolate itself from that of the past. Indeed, no music has ever yet done so in the course of history. But it does make the modern composer's task very much harder, if he is at all enterprising and independent. For there is always the tendency, among those who receive art passively and know little about its making, to refer a creative artist's work back to what an earlier tradition has taught them to regard as right and proper rather than to accept it as

they see, in real life, but also because it does not seem to them to make agreeable pictures. The reason is that they have certain ingrained conventional ideas of what pictures ought to look like, not only as representations of nature, but as pictures. They must be aware, surely, unless they wilfully blind themselves, that a landscape by Poussin or Ruysdael or Constable is not really like anything seen in nature any more than is a Cezanne or a Paul Nash. They are too often unaware that they do not look for anything like nature, though they persuade themselves that they do, but for something which more or less unchallengingly conforms to the manner of hundreds of other pictures they have seen.

Much the same happens to people who find themselves confronted with modern music, which they believe they are unable to appreciate because they have their notions of what music ought to be and will not let the composer have his own conception of the art he practises. They will not readily accept a modern symphony, such as Sibelius No. 4 or Vaughan Williams in F minor, because they have learnt from Haydn and Mozart and Beethoven what they think symphonies should be like and refuse to consider any other solution of the problem, regardless of the fact that those three classics themselves, who are fundamentally quite different from each other, all faced it in as individual a way as do modern symphonists like Albert Roussel, William Walton or Edmund Rubbra.

Nobody, perhaps, would be quite so foolish as to say, with Gounod, that Cesar Franck's Symphony could not possibly be a symphony because it contained a part for a *cor anglais*, but people do say that modern symphonies which fail to conform to the classical pattern are misnamed, even if they can, by the exercise of special charity, be called music at all. Well, there are other reasons than Gounod's why the Franck Symphony is not a very good example of its species—not because it does not conform to pattern, but because it substitutes a new pattern that is in some ways inferior. On the other hand, there are any number of possibilities of substituting superior or at any rate equally good patterns. The symphonies by any of the modern composers I have named above are better, as such, than any of Schumann's, for instance, which are lovely music but bad symphonies. They conform closely enough to the classical model, but that does not save them, yet it is possible for conventional judgment to pronounce them good symphonies as well as good music—indeed, the overwhelming probability is that such judgment will so pronounce them. It is the

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they see, in real life, but also because it does not seem to them to make agreeable pictures. The reason is that they have certain ingrained conventional ideas of what pictures ought to look like, not only as representations of nature, but as pictures. They must be aware, surely, unless they wilfully blind themselves, that a landscape by Poussin or Ruysdael or Constable is not really like anything seen in nature any more than is a Cezanne or a Paul Nash. They are too often unaware that they do not look for anything like nature, though they persuade themselves that they do, but for something which more or less unchallengingly conforms to the manner of hundreds of other pictures they have seen.

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easiest thing to do, as easy as to say that a Dutch still life is exactly like reality, which is only quite superficially true, for all good art is an interpretation, not a representation, of stimuli taken from the outward world, so far as it resorts to them at all. The fact that such cut-and-dried judgments should be so easy constitutes our first difficulty in approaching modern art of any sort.

The second difficulty, in the matter of modern music, is that there are so many different kinds, even if we rule out all the bad and inferior kinds. In the eighteenth century it was comparatively easy to decide that if Haydn was good, Mozart must be good also, in the early nineteenth century one could pretty well rely on those who appreciated Beethoven to enjoy Schubert as a matter of course, and most people now gladly accept both Wagner and Brahms, bitterly as opinions about them were divided in their own time. But it is by no means easy today for anyone who has carefully cultivated a liking, let us say, for Stravinsky or Alban Berg suddenly to see as much good, or more, in Bela Bartók or Ernest Bloch. Each of these composers, of course, does not see why anyone should like the others, but that is their business. The rest of us must be patient.

The ordinary listener is often impatient with their idiosyncrasies, however, and there is some excuse for him, not only in the bewildering variety of even the best modern music, but in what sets a third difficulty in the way of his understanding, which is the absolute and utter dissociation in our time of popular from what we call "high class" or "high-brow" music. This is a modern phenomenon, at any rate in music, though I gather it also shows itself to some extent in science. In the Middle Ages a folksong, even one associated with ribald words, could become the *cantus firmus* in a Mass, in the eighteenth century, entertainment music was as a matter of course supplied by the great as well as the smaller composers, so that the difference in style, and even in form, between a *divertimento*—literally a diversion—and a symphony by such a master as Mozart was as a rule hardly perceptible. Beethoven and Schubert still wrote popular dances, and so, for that matter, did Brahms and Dvořák much later, though for concert use, not for actual dancing. Great composers seeking occasional relaxation in writing light music come as near our time as Elgar and Sibelius, whose *Salut d'amour* and *Valse triste* were quite at home in the Edwardian teashops, but nowadays the purveyors

of jazz (often very accomplished in their way) and of musical comedy (sadly deteriorated) make one party, while those who take composition seriously make another. They cut each other dead completely, except now and again in the U.S.A., where the latter delude themselves into the belief that there is some sort of a foundation for a permanent national music in jazz, which has also entered into so-called "art music" here and there in Europe by way of caricature and satire. This schism between two aspects of what appears to be one and the same art, aspects which confront us side by side on the wireless without showing the least vestige of any terms of comparison, makes the modern musical world seem altogether too crazy to those who seek to understand it. As for those of us who wish to offer guidance, we can do little more than admit the anomalous situation and suggest that it should be accepted without any attempt at seeking a common denominator between the would-be entertaining and the would-be edifying.

There is no harm in seeking entertainment. Even those who insist on being edified may look for it, so long as they do not expect to find it easily in serious modern music, which is the more difficult for its aloofness, not only from the world of amusement, but also from that of patronage which kept it going in earlier times and expected it to conform to certain conventions that made its acceptance by cultivated but not specially trained audiences possible. Audiences are still largely untrained, and musically accomplished amateurs have not very noticeably increased; and both have ceased to exert any special influence on the creative artist, who does not feel in any way bound to give them what they



Mozart

MOZART
1756-1791

Drawing by Doris Stock



VAUGHAN WILLIAMS O.M.
Born 1872

Drawing by Leo Hardy
(From Music & Letters Jan 1937)

want. He gives them, more often than not, what he wants them to want. That, too, is one of the great difficulties

Let us now face the greatest difficulty of all presented by modern music, one comparable with that of surrealism in painting and sculpture. It is the problem of atonalism, which we had better consider from the point of view of the new music devised by Arnold Schoenberg and his school, if only because they have reduced it to so definite a system as to make it sufficiently easy to understand, though not, therefore, equally easy to accept and appreciate, since systems, being pure theory, do not necessarily induce creative inspiration.

Schoenberg's theory, on which his latest creative output relies, is that music no longer has any use for tonality. It must not be written in such and such a key, with a tonic or keynote as the centre round which a whole composition revolves and to which it returns, however far away it may have modulated during its

course Nor do certain notes take precedence over others, as those of the major or minor common chord used to do in works written in major or minor keys There is no hierarchy assigning different degrees of importance to the twelve notes of the chromatic octave they are all equal in the sight of this new creator, who accordingly has taken to writing music based on what he calls the "twelve note scale" This equality has to be so rigidly enforced that every musical theme is required to contain all these twelve notes but must touch none of them more than once within its series, which series is then used over and over again to the end of the composition These twelve notes may appear in any order, so that, mathematically considered, an immense number of permutations can be arrived at, and as they may be arranged in any rhythmic patterns the composer may desire, the possibilities are endless Moreover, three variants of the fundamental sequence of notes are permitted the pattern may be used back to front, it may be used inverted (the rising intervals being turned downwards and vice versa) and the inversion may also be reversed

These patterns are quite clearly visible to the eye, at any rate so long as they are shown in plain notes and not in rhythmic arrangements, so clearly, indeed, that they will be obvious even to those who do not read music I will therefore make bold to show a specimen in musical notation, which will give an idea of the Schoenbergian system even to non musical readers It will be seen at once that the first example represents the same pattern of notes going in two different directions, the second being the first as though seen in a mirror



and it will need very little more discernment to perceive that the next array of notes is the same forward and backward formation, both turned upside down



but it will be noticed that, in the inversion, some octave displacements were required to make sure that all the intervals move up or down in the opposite direction The first C, for instance, which is also the last of the mirrored version, now stands an octave higher

know what he is doing Let him play it reversed not one will have the ghost of an idea of what is going on

Twelve note music, then, at any rate so far as the Schoenbergian system goes, fails to satisfy the one valid final criterion—the ear But this is not to say that a freer application of its principles will always fail to do so We have in fact had proofs to the contrary, as, for example, in Schoenberg's own *Pierrot lunaire*, where one is conscious, not of the technical procedures, but of the intellectual discipline to which they subjected the composer, or in Berg's remarkable violin Concerto The one thing I am anxious to avoid is that readers should face modern music with an even less open mind than they did before reading this article Modern music must be considered as critically as any other, and even twelve-note music at its most systematic may serve as a mind opener, whatever may be said against it The most general complaint about modern music, apart from the allegation of decadence or ugliness or dishonesty, and so on, is that it is so inexplicable The twelve note system furnishes an excellent answer to this, for what is wrong with it is exactly that it is very much too explicable

Technical explanation alone should not make all the difference between aversion and understanding If it does, then we may be sure that the music is only interesting, which is of course not enough to make it lastingly valuable Successful experiments in art are as fascinating as they are in science, but while the scientist may be genuinely thrilled by them, the passive artist—as we may call the listener or spectator at his best—is not What thrills him is inspiration, which is technically explicable only up to the point beyond which we look for very much more to satisfy us We do not want to understand music merely, we want to love it or at least to bring a lively appreciation to it

That, one is often told, is exactly what modern composers make so difficult, or even impossible One hears this said in an aggrieved tone, as though they did it on purpose No doubt some poseurs among them do, but they do not count in any case, nor has their music the least chance of enduring Those who do count are, as great artists have always been and can never fail to be, sincerely intent on being understood, not indeed by those who have no wish to understand anything, but look merely for the easiest enjoyment, but by the greatest possible number of people of a mental cultivation not below reasonable normality If such composers are difficult nowadays—and it is true that on the whole they are—it

These displacements are, of course, a technical necessity as well as a concession, not only because without them the intervals could not all be inverted, but also because a whole composition would be constrained to move within a single octave. As a matter of fact, any note is allowed to appear in any octave the composer may choose, from the lowest bass to the highest treble in which music remains audible, and this again widens his scope still more immensely.

Here, as a mere example of the infinite ways in which my chosen pattern alone could be used, are two different rhythmic arrangements



The first, it will be seen, uses the twelve notes as shown in the first musical quotation (a) above, all in the same position within the octave, while the second shows them in their reversed (mirrored) order, with free and arbitrary octave displacements of some of the notes.

Now this is all quite clear to the eye, certainly of those who read music and, I hope, even to those who do not, for it really is simply a matter of patterns. But this is where we come upon a snag. Seeing is not believing in music, which is not, or should not be, an art for the eye, nor should it be a matter of patterns, at any rate not this sort of visible patterns. And that brings me to the essential fallacy of atonal music, at least in so far as it has been turned into a system by Schoenberg and remains a mere system in his hands and those of his disciples. For music is ultimately judged by the ear, not by the eye, and the plain fact is that, although twelve-note music of this patterned kind is often fascinating to study with the aid of a score, its ingenuities are for the most part entirely lost on the ear. The simple truth is that not one listener in ten is conscious of the fundamental note series when he hears a rhythmic pattern based on it which contains a liberal amount of octave displacements, while not one in a hundred, to put it very moderately, recognises any series of twelve notes that has been turned backwards or upside down, let alone both. Inversions are easier than reversals if the rhythm is distinctive, the latter are all but impossible to spot, even if the tune is familiar, because the rhythmic factor changes entirely. Let the reader play "God save the King" upside down. It may be that a few of his friends will

know what he is doing. Let him play it reversed : not one will have the ghost of an idea of what is going on.

Twelve-note music, then, at any rate so far as the Schoenbergian system goes, fails to satisfy the one valid final criterion—the ear. But this is not to say that a freer application of its principles will always fail to do so. We have in fact had proofs to the contrary, as, for example, in Schoenberg's own *Pierrot lunaire*, where one is conscious, not of the technical procedures, but of the intellectual discipline to which they subjected the composer, or in Berg's remarkable violin Concerto. The one thing I am anxious to avoid is that readers should face modern music with an even less open mind than they did before reading this article. Modern music must be considered as critically as any other ; and even twelve-note music at its most systematic may serve as a mind-opener, whatever may be said against it. The most general complaint about modern music, apart from the allegation of decadence or ugliness or dishonesty, and so on, is that it is so inexplicable. The twelve-note system furnishes an excellent answer to this, for what is wrong with it is exactly that it is very much too explicable.

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That, one is often told, is exactly what modern composers make so difficult, or even impossible. One hears this said in an aggrieved tone, as though they did it on purpose. No doubt some poseurs among them do, but they do not count in any case, nor has their music the least chance of enduring. Those who do count are, as great artists have always been and can never fail to be, sincerely intent on being understood, not indeed by those who have no wish to understand anything, but look merely for the easiest enjoyment, but by the greatest possible number of people of a mental cultivation not below reasonable normality. If such composers are difficult nowadays—and it is true that on the whole they are—it

is not because they seek to be so, but because they live in difficult times. We must expect to find the perplexities of our days reflected in the work of the most responsible artists, just as we saw the irresponsibility of the years immediately following the first world war reflected in a good deal of music that was either purely frivolous or merely experimental, particularly in the French school which then enjoyed an easy and rather graceful flowering since proved to have been singularly barren.

It may be objected that earlier composers, too, lived in difficult times, but that they more often than not managed to preserve the serene detachment we now call classical. But two things are to be said to this. In the first place, the idiom of the classics now seems to us much more urbane than it was for their contemporaries. Mozart, for instance, whom so many people still infuriatingly call a "pretty" composer, often reveals an extraordinary bitterness and agitation to those who really know him. In the second place, we must remember that the modern composer's much greater independence from patronage has saddled him with a personal responsibility that cannot fail to make him express himself far more uncompromisingly and by means of far more elaborate devices than those who wrote most of their work to order. This is no very new thing—it began with Beethoven, but it has become very much more marked now that resources have grown infinitely more complex by accumulation.

These more elaborate devices and more complex resources appear to most people to be mainly harmonic, the reason being that chords, and more particularly discords, are always the musical features that immediately strike the ear, probably because a chord is the one musical incident capable of making its impression instantaneously and not depending on the factor of time—on the before and the after—as melody, rhythm, counterpoint and even in a way tone-colour do. But it must not therefore be supposed that it is only in the matter of harmony that the music of yesterday and today differs from that of the opening of the present century, and does so more and more from that of the bygone centuries as they recede into the past.

An attempt must now be made to show briefly and so far as possible non-technically in what widely different ways music can renew itself and how modern composers of various types (and nationalities, for they are a determinant sometimes) face their problems and often deliberately create new ones for themselves.

To do this in a book of a general nature is to run the risk of failing to interest some readers, who may be looking for general principles only and not for practical details ; but I have gone at some length into particulars of Schoenberg's twelve-note system, which happens to be a convenient and easily analysable topic, precisely because it is a system, and the danger must at all costs be avoided of conveying the idea that this kind of new music is the only kind worth discussing. There are many other tendencies, and several of them are more vital, though not necessarily more enterprising or intellectually stimulating

These tendencies might furnish matter for a great deal of musical discussion if this volume happened to be exclusively reserved for that : as it is not, I shall confine myself mainly to some of the composers whose names have already appeared in my exposition. As it happens, they offer interesting material for the separate study of the various elements that go to the making of music, so long as the reader will be sure to bear in mind that each of them has contributed something to the development of all those elements, more or less. If only one or two are discussed in connection with this or that personality, it is because his art can be conveniently used to make a particular point, as for instance one would naturally discuss the art of chiaroscuro in connection with Rembrandt, without therefore suggesting that no other painters understood it or that he knew nothing about design or perspective or grouping.



JEAN SIBELIUS Born 1865



ERNEST BLOCH Born 1890

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JEAN SIBELIUS Born 1865



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Not the most conspicuous but certainly one of the most important of the factors that go to the making of a musical composition is form. A composer with a grasp of form is one who understands looking—or listening, rather—before and after, of leading from one thing to another, of setting climaxes in the right places, and so on, and also, in any music that has not abandoned tonality, of creating the feeling of a central key and letting the music modulate to subsidiary keys for certain episodes without destroying that sense of a home tonality from which the music sets out and to which it returns.

For supreme mastery of form that is also a new kind of mastery we may very well go to Sibelius, the one great composer ever produced by Finland. Each of his seven symphonies is remarkable for the way in which it seems to have generated a form of its own that is exactly suited to the music it contains. The first two, which still retain a fair amount of conventional material, keep correspondingly close to the traditional symphonic form, modified not more than it is in Tchaikovsky's symphonies, for instance. The third becomes more venturesome both in shape and content. In the fourth we are suddenly in a new world—its music is so strange and so utterly unlike any other that we cannot even be sure that it is particularly modern. Nos. 5 and 6, though absolutely individual, are less disconcerting. In No. 7 Sibelius succeeds in packing as much thought and eventfulness as used to make up the four movements of a classical symphony into one single piece with so convincing a beginning, a middle and an end that nothing more could conceivably be added to it. At the same time one could never take away from this or any other mature Sibelius work, where there is no padding and no waste matter of any sort.

Sibelius may also serve us for a brief mention of another musical factor—that which we call tone colour. He is as great a master of orchestration as of form, and certainly of a new and absolutely individual orchestration that would suit any other music as little as it perfectly suits his own. It is simply one with the rest of his musical substance. He does not, as many composers used to do, and some still do occasionally, though they have been taught to know better, compose as it were in black and white—in terms of the pianoforte—and colour the music separately by scoring it afterwards. To his mind a musical notion at once presents itself in the instrumental hues that suit it best.

Colour, in music as in painting, is often a special virtue of French art. We find a keen, a delicate sense of it in Roussel. But I should like to cite his work for another quality, a not so strictly technical one, perhaps, as that of a fitting use of such actual musical materials as melody or harmony or rhythm, but an important one in composition all the same: a feeling for style. I do not now mean style in the sense of individuality, of *le style c'est l'homme*, though that too matters considerably; the gift I find strongly developed in Roussel is that of knowing what is proper to any musical task he sets himself. That is to say, he will not write chamber music with any orchestral opulence, he will not bring operatic effectiveness to bear on a symphony, he will not make a song sound like a cantata or like an aria from an oratorio, etc. His art is not one of great vigour, possibly because the achievement of style depends largely on negative merits, on the avoidance of trespasses, rather than on definite attainments; but it is an art showing extraordinary taste and refinement, and although it is novel in many ways, it never gives the impression of striving after novelty for its own sake.

Stravinsky too is greatly concerned with style—or rather with styles, which is not quite the same thing. He is not interested in the problem of carrying out each task he sets himself in such a way as to reflect his own personality; what interests him is other composers' approach to music. He is rather like an actor, only partly a creative artist and in a great measure a re-creative one. He has written a piano concerto that looks back to Bach, a kind of stage oratorio that takes Handel for its model; he has made a ballet from music by Pergolesi and another which revives Russian folk-song of the most primitive kind; he has scored one work for a jazz orchestra of sorts, another for a combination resembling a village band, a third for what might have been the "king's 24 violins" of Lully's time; he decided one day that Tchaikovsky is a good composer, whereupon his obedient literary champions immediately proclaimed to all and sundry, as though it were a new discovery, that they may go on liking Tchaikovsky with a clear conscience. And so it has continued, with a long series of works, some fascinating, some exasperating, each of which faced a wholly different problem and solved it with varying æsthetic success, but always with extreme technical brilliance. Stravinsky can do anything amazingly well, whether it is worth doing or not, and of course he does it all in what is ultimately a way of his own, for he must not be regarded as a mere *fashioner*. If he is not a master

of style—one individual style—he has a superb command of what may perhaps best be called manner.

Style is a personal thing, manner is more derivative and extrovert. The latter may also be national or racial, in which case, however, it may be better called idiom. We find a strong national (English) idiom, for example, in Vaughan Williams and even a stronger racial (Jewish) one in Bloch. Both go back to ancient musical origins, such as English folksong and Hebrew chants respectively, but their importance as modern composers lies in the fact that they transmute these age-old rudiments into a living art that belongs exclusively to the present day. Bartók is another composer of this kind, with the difference that his work is based on old Hungarian folk music, not of the alien gypsy type made familiar by Liszt and others, but the true native Magyar peasant lore, which has a kind of rustic carved-wood squareness and roughness that is also characteristic of Bartók's music. But that music is at the same time highly sophisticated technically, and anyone who wishes to watch new developments in harmony or in rhythm and metre could hardly do better than to study Bartók, in whose work new chords, sometimes forbidding but always logically applied, will be found in abundance and to whose command of unaccustomed rhythmic and metrical devices there seems to be no limit. Here, for a single example chosen among hundreds, is one of his harmonic formations (from "Microcosm", No. 107) :



and here is one of his more curious rhythmic devices (from do., No. 137) :



It would be interesting to show also one of his metrical schemes,

but that would require more space than I have at my disposal, for the difference between rhythm and metre, it may be as well to say at this point, is largely one of size, rather like that between a single line and a complete stanza in poetry. The last example shown above is a rhythmic shape; a metrical scheme such as Bartók might employ would be, for instance, a series of three melodic phrases each of which takes up the space of four bars, followed by a concluding one which, instead of symmetrically covering yet



WILLIAM WALTON *Born 1902*

another four bars, occupies only three or is extended to five. And of course he can be very much more complex than that, for he might easily write a melodic period where the main sections divide themselves into phrase-lengths of, let us say, $2 + 3 + 5 + 4$ bars.

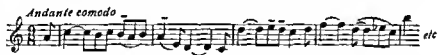
That brings us to melody, of which conservative listeners often profess to hear no vestige in any modern music. That is, it hardly needs saying, utter nonsense. All the composers I have so far mentioned are full of melody, and anyone who does not hear it in their work may quite safely conclude that he has no notion of what melody is, but relies for its recognition on some conventional and wholly artificial notion of what it ought to be. I have heard



BÉLA BARTÓK Born 1881

(by permission of Boosey & Hawkes Ltd
London publishers of the works of Béla
Bartók)

a serious but very unadventurous music lover declare with the utmost conviction after a performance of Walton's viola Concerto, that he was unable to detect a single tune in it from first to last. Well, the solo part of this work opens thus



If that is not a tune, I do not know where to find one in all music, from plainsong and "Sumer is I-cumen in" up to Walton and indeed including him, since not only the viola Concerto but all his work is music that relies quite conspicuously on melody for its very existence. That is true also of Rubbra's work though in his case the type of melody is entirely different and much more often so devised as to lend itself to contrapuntal treatment.

Here we come upon the last of the musical elements singled out for discussion—counterpoint, which is the technical term for the art—the most difficult of all in music—of combining two or more melodies in such a way that between them they make a satisfying

texture of parts It is possible to write music without knowing anything about counterpoint, and indeed most bad and all light music is entirely innocent of it Even a good work, for that matter, may consist merely of a tune (generally but not necessarily in the top part) accompanied by a succession of chords or some simple texture of chords broken up into figuration of one sort or another In true counterpoint the interest lies in the simultaneous continuance of different melodies side by side, the harmony they produce by their companionship being a sort of cunningly planned coincidence or, as it had perhaps better be called in the case of really inspired contrapuntal music, divine accident Counterpoint is an old art that culminated in such masters as Palestrina and Byrd in the sixteenth century, and it tended to decline in the classical and romantic periods, which happened to lay greater stress on the cultivation of form and of colour and atmosphere respectively Modern music, however, often resorts to it and has found various ways and means of evading the very strict rules that once governed it, thereby, it must be admitted, making it much easier to handle, but also enlarging its scope very considerably There is, for instance, what is termed "linear counterpoint", practised by such composers as the Frenchman Darius Milhaud, the Franco Swiss Arthur Honegger and the German (but not *persona grata* with the Nazis) Paul Hindemith It is called "linear" because it relies more than classical counterpoint did on the independence of each of the melodic "lines", whose meeting need no longer produce harmonic effects according to certain precepts devised to avoid drastic discords and awkward progressions, but may at times grate very harshly upon the ear, which is expected to take less notice of the clashes which thus result than of the progress of each melody as a separate entity

Atonality and polytonality have a great deal to do with counterpoint the latter is in fact essentially a contrapuntal matter, while atonal music may be any kind of music written in no particular key and never suggesting even a temporary key centre very definitely Polytonal music, on the contrary, is music written in several keys at once, and the most convincing way of doing this, of course, is to write two or more independent melodic parts, each in a different key, to be played or sung simultaneously with an effect that sounds haphazard and more than likely extremely discordant, but must needless to say be the result of high skill and very deliberate calculation if it is to be of any artistic value Here is an example of

a case of acute polytonality from the string Quartet, Op 37, by the Polish composer Karol Szymanowski

Fivace ma non troppo

Violin I (A major)

Violin II (F# major)

Viola (Eb major)

Cello (C major)

etc

All this, it will have been noted, is rather complicated. Indeed, the modern listener's perplexities arise largely from the fact that music, inevitably, has lost its innocence, so to speak—that is to say, it has lost simplicity, not necessarily of technique, for old music could be very complex, but of appeal. Of course, there still are musicians who write simply, but not many really great men are able to do so from choice. Some composers have simplicity thrust upon them—but not greatness, unfortunately. That cannot be done, as recent attempts even in very powerful quarters have shown. It is true that individual patronage has gone almost entirely, and on balance one need not regret it, but something else has taken its place which, so far as one can see, there is reason to deplore. It is official interference, the most characteristic and, so far as art is concerned, the most disastrous sign of the times in more than one country. Creative musicians (and no doubt other artists) cannot respond to the dictates of anything but their own inspiration, however much they may approve of their rulers' principles. Soviet Russia has, as yet, shown no signs of having turned out a composer of the calibre of Stravinsky or Medtner—to name an adventurer and a traditionalist who, Russian born, have both made their mark on the world at large—though it does produce an astonishing number of gifted people who write music, and the two most remarkable who have recently submitted to compose what and as they are told, Prokofiev and Shostakovich, have certainly not gained in distinction thereby. What does make a difference between Nazi Germans and Soviet Russians, one feels,

is that the former, with fine musical scholarship behind them (rather far behind now, perhaps) ought to know better than to ruin a great tradition willfully, whereas with the latter it is all rather young and immature and self-consciously uncertain, and will settle down as soon as the next great genius appears.

Perhaps we should not talk. State interference is not one of our artistic afflictions, and we may hope it never will be, much as we shall welcome State aid; but without it we find that the public at large, instead of being given rather watered-down music written

by people of certain technical attainments, is simply left to choose for itself and, as ever, with a sure instinct chooses the worst. Popular music in this country has not recently changed for the better, certainly. There is jazz, of course, or rather—begging its pardon—swing, if that is really the latest label, and at least it wears a very high polish of efficiency; but it is exotic. Musical comedy goes on deteriorating so steadily that pieces we thought sheer sentimental rubbish a dozen or twenty years ago can now be revived as classics of their kind. However, if our unmusical lovers of a song they can whistle and a dance they can hum have made no progress whatsoever in taste, there are signs that they are less numerous than they were a generation ago. One sees more young people at orchestral concerts year by year, and there is no doubt that the wireless, the gramophone and particularly the more serious attention paid to the subject in schools have done much to make them, at any rate, aware of the existence of great music. That being so, we may also count upon some to have begun to respond to its quality.

To return to modern music, we may quite boldly say that a beginning has been made in true appreciation of its best manifestations by those who find in themselves a response to fine quality. For it

Stravinsky
1917
T



IGOR STRAVINSKY Born 1882
Drawing by Picasso

is that which matters here, just as it does in older music, the only difference—and additional difficulty—being that among new composers we have to do our own weeding out, whereas history has already done it for us, to a great extent at least, among those who went before. No new music that has not fine quality really need concern us. We may legitimately be interested in experiments and momentarily excited by unexpected discoveries, but we must learn to distinguish between what is important and what merely arresting. Perhaps I should have said that we must try to find beauty in modern music, as indeed we may very well do. I try to avoid the word "beauty", however, for two reasons: (1) because it is still associated in many musical minds with conventional procedures, especially in the matter of harmony, and (2) because it is quite possible to accept with pleasure artistic exploitations of things that are superficially displeasing or even frankly ugly.

Music does not improve or deteriorate as the years go on, it simply continues to throw up new phenomena as different composers arise, some good, some not so good, with a great one among them now and again, perhaps not as often as we think, perhaps suddenly, once in a way, when we have not suspected it even from our knowledge of his work. Some give us surprises and some give us shocks, but we must not let that put us off taking them seriously until they have given themselves away as worthless, or we have been discerning enough to prove them so to ourselves. Nor should we be too wary of being taken in by allurements that may look bedraggled when we wish to recapture their spell later on. It does not matter. Such lessons are good for us. We must boldly survey the contemporary scene and make our own choice without fear of mistakes. We shall then find at times, instead of excitements falling flat, depression turning into exhilaration.

If we do not delude ourselves with ideas of progress, which would mean that what is composed today ought to be better than Bach and Beethoven, and thus lead to disappointment—and quite right too, since it would be absurd to do without the masters of the past merely because we want to give the present its due—we ought to find adventuring among contemporary music endlessly fascinating, whatever it may lead to, for perhaps the most enthralling experience the passive artist can have is that of change, the more so because in art it is an endless, inexhaustible renewal of experiences and principles that have held good throughout history and will

always continue to do so. And change in plenty is certainly to be had from the contemporary musical output, which is enormously rich in variety.

We must never allow ourselves to be frightened by modern music, however forbidding its new expressions may be, for unless its composer happens to be utterly futile, in which case we shall find him out sooner or later, we may at any moment come upon some revelation of eternally valid truth and—yes, believe it or not, of beauty. The word will out, after all, and it may do so, if the reader will agree to accept it in its proper sense. It is absurd to talk of “modern” composers as though they were some sort of leprous colony that must be carefully segregated from the normal human family of great musicians—who were all “modern” once. To label those now working “modern” is to emulate the French landlord who called his establishment “Hotel de l’Univers et du Portugal.” Music is universal, and the best of contemporary composers are not “Portuguese” (Lisbon will realise that I merely keep to my metaphor). They, too, will be “de l’Univers” as surely as any classic if they have a true message for mankind. And, of course, the mere fact that they are or were alive in the twentieth century cannot be taken to mean that they are disqualified from artistic world citizenship.

JOHN MACMURRAY

CHANGES IN PHILOSOPHY

Stocktaking for new ventures

All of us who have read the chapters by Professor Bernal and Dr Waddington will be aware that the great changes taking place in our society now are closely connected with the rapidity of scientific development in the last few decades. Compared with science, philosophy might seem to be unchanging. Plato and Aristotle, almost the first philosophers, are still reckoned as perhaps the best. They are still studied by thousands of students in our Universities, and quoted as authorities. The questions they debated with their students in the Academy and the Stoa in ancient Athens are still debated, and philosophers seem no nearer agreement on the answers.

Some people think that this proves that philosophy is eternal, others that it shows that philosophy is bogged in a morass of nonsense. Both views have an element of truth in them, but both are superficial. Like science, philosophy has two aspects. It is a body of problems which we want to solve. It is also a method of investigation. Originally science was part of philosophy, and scientific questions were investigated by the philosophical method. Science was separated from philosophy a few centuries ago, when some people began to use a new method to investigate some of the questions that philosophers studied—particularly the movements of material bodies. This new method was the use of observation, measurement and experiment, and it has proved immensely successful. The development of science has been largely dependent on the invention of new forms of this method, and upon the invention of new instruments which extend the range of our observation and increase the accuracy of our measurements, such as the spectroscope, the use of which has been fascinatingly described by J. G. Crowther in his chapter on astronomy.

To understand the change which this withdrawal of parts of its subject-matter produced in philosophy, we must know something about the method of philosophy as well as about its substance. All knowledge is unification. We fit fragments of direct observation into a framework of ideas. If I have never been to Leeds, how can I know where it is? I need first an idea of the shape of England which I get from a map. I also need to know by direct experience some place in England which I can fix on the map, perhaps Southampton. Then I can discover how far Leeds is from Southampton, and in which direction. All knowledge consists of fitting into a general scheme, which we have in our minds, elements which we know by direct experience. It is a process of



The plight of the earliest map makers :—different people made maps of different countries without a vision of the whole or agreement to draw them uniformly. This map was made by Hecataeus in 517 B.C.

fitting pieces together to make a whole—like a jig-saw puzzle ; only it is surprising how few of the bits we have to start with.. We have to guess most of them. So the discovery of new knowledge is a sort of map-making.

A science is an attempt to make a map of a particular aspect of the world. The geologist seeks a picture of the processes which made the shape of the earth's surface as we find it today. His picture takes us back for millions of years ; and he draws it by fitting what he finds now into an imaginary scheme which includes the past and the present. He makes this scheme by assuming that the forces which we can observe changing the earth's surface now have been operating in much the same way for millions of years.

Into this scheme he fits events in the far past, like the formation of rocks and mountains, or the first appearance of particular animals. He decides the order of these events by arguing from what he can observe directly now. Rocks which are found below others must have been formed before them. The main principle which guides him is that the whole map must make sense. It makes sense when it makes a whole, a single continuous unity into which what we can directly observe fits exactly and consistently. This in fact is what is meant when people say that science "unifies experience."

Philosophy tries to make its map, not like the sciences, of selected portions of our experiences, but of all of it together. The success of science is achieved by limiting each science to a special field. Suppose we started off to map the world by having different people make maps of different countries without any agreement among them how the different maps would be made, and without having decided whether the earth was flat or round. This was, in fact, the plight of the earliest map makers. Then we might imagine that it would be fairly easy to make a map of the whole world. But would it? The maps would certainly not be drawn to the same scale. The conventional signs would be different in all of them, and some of the map makers, perhaps, believed in a flat earth and others in a round earth. What is certain is that very few of the maps could be fitted into a general map without considerable alteration, and that some things, like the shape of the earth as a whole, and the distribution of the oceans, would have to be settled first, which the local map makers did not need to bother about.

The philosophical map is the general outline map of the whole of human experience. Into it the local maps of different sciences have to fit. There are two special difficulties to be met. It is the outline of the different maps that matters, not the details inside. These outlines are the general theories of each science, not the sure facts which it has ascertained. And the sciences are busy all the time altering their theories, and at this moment especially they have been altering them out of all recognition. The other difficulty is that all the sciences taken together cover only a small part of the territory that philosophy has to map, and that not the part which is most important to the task of the philosopher. Nor do the sciences have to bother about settling the *ultimate* character of our experience, which must be determined before a general map of the whole of it can be made.

PLATO was, with Aristotle, among the first philosophers and still reckoned perhaps the best—he founded the "Academy," the first European University, in Athens about 387 B.C.



The greater part of human experience is *practical*. It concerns our desires, our tastes, our aspirations, our purposes. The shape of our practical experience is fixed by our ideas about how we ought to behave. These in turn depend on what we think good or bad, desirable or undesirable. — Philosophy has to decide, in principle, what the value-structure of the world is ; and this is the problem of Good and Evil—the main problem of practical philosophy. This whole range of experience lies outside the scope of science altogether, though in one way or another it governs all other problems.

Even on the theoretical side the main questions of philosophy lie beyond science. For, though science can leave out the personal and subjective factors in our experience, philosophy cannot. Science can concentrate on the objects we seem to know ; but philosophy has to take in *us knowing them*, and has to decide whether what we think to be knowledge really is so. With this, science becomes part of the problem, and we have to ask whether scientific results are really knowledge in the full sense, or only ways of describing the world which have been found practically convenient and successful. I once heard a scientist assert that science is really only a modern mythology. I cannot believe him ; yet I am puzzled when I find one of our greatest scientists, Sir Arthur Eddington, suggesting that physical science can only tell us what we shall see if we look, and not what is really there. If scientists themselves can think such things, it is clear that the fundamental questions about the world have not been answered by science ; and that the philosopher cannot take science for granted. Science hardly helps at all to answer questions about the existence of a God ; or of an after-life ; or whether the material world has an independent existence of its own. Science cannot even investigate such problems, because the scientific method of observation and experiment cannot be applied to them.

The *method* of philosophy has always been purely logical. Assum-



SPINOZA, born Amsterdam 1632, died 1677. He was excommunicated by his own Jewish community as a Heretic and both reprobated as an atheist and described as a "God Intoxicated man"—one of the very greatest modern philosophers

ing nothing that does not seem absolutely sure, examining every idea and argument for hidden ambiguities and errors, the philosopher seeks by logical criticism and systematic logical thinking to produce a structure of ideas into which every element of human experience can be fitted without inconsistency, without overlapping and without gaps. Philosophy develops by the criticism of these constructions. One philosopher discovers the inconsistency or incompleteness of his predecessor's system ; and then takes it to pieces and tries to rebuild the structure in a way that will include what was left out, and avoid the errors that have been brought to light. It is not possible (as it is in science) to secure results in one section of the field and then use them as a basis for tackling another section. Philosophy must deal with the whole system at once, because the satisfactoriness of any part is guaranteed only by the coherence of the whole. That is one reason why philosophy seems to make so little progress compared with science. It cannot rely on observation and check its results by experiment.

But philosophy does change ; and its changes have a clear relation to the change and development of society. Since the Middle Ages, there has been a special relation between the progress of science—the new agent of social change—and the transformations of philosophy. It is not surprising, therefore, that in the last few years, during which the impact of science on society has reached revolutionary proportions, we should find a major crisis in philosophy, which has much the same origin. I refer to

Positivism asserts that there is still a use for it. In all our investigations we have to use some language as our instrument. Ordinary language has defects which are not easily overcome. In particular, it combines the statement of fact with the expression of feeling. Where possible, science substitutes mathematics for it, and the most successful sciences are those which can do this most completely. But, as a language, mathematics is too limited in its application, though within these limits it achieves complete exactness and a complete freedom from emotional intrusions. Philosophers have always recognised the need to purge language, for logical purposes, of its emotional elements, and it has been part of the task of the science of logic to do this. Traditional logic, however, was content if the statement employed had the *form* of a statement of fact. We have just noticed that the reason why Logical Positivism dismisses all the "philosophical" questions as meaningless is that though *in form* they seem to be about facts, they are concealed expressions of feeling.

Modern logicians—like our own Bertrand Russell—have therefore invented a new logic, which is a kind of extension, or generalisation, of mathematics, and which can be used to bring to light concealed expressions of feeling in ordinary speech, and to formulate statements which are exact and not "meaningless" over the whole field of observable fact. This logic is called Symbolic Logic, because of the extensive use it makes of special symbols to replace ordinary words, and the use of it to reveal the strict logical structure of ordinary speech is called the Analysis of Language.

This, then, is the revolutionary doctrine of Logical Positivism. Philosophy must give up the old philosophical problems, because they are meaningless and unanswerable. The field of knowledge proper belongs to science and to the scientific method. Philosophy must find its task, in the future, in the Analysis of Language. This is a humble, but an essential task. For it enables us to distinguish between real and unreal questions, and to formulate properly the questions which can be investigated with any possibility of success.

What are we to say about this revolution in philosophy? Many philosophers will certainly refuse to accept the conclusions of the Logical Positivists, or to agree that all the assertions which are ruled out by the new theory are without a logical meaning. But I cannot take this rejection of the new theory so cavalierly. It

seems to me to be true that the unaided intellect, working by pure logical processes, is incapable of answering the traditional problems of philosophy ; and that the Logical Positivists are right in the reason they give for this—that all these problems involve elements which express feeling, and which are not matters of fact. But does it follow that philosophy must therefore throw overboard all these old questions—which after all we cannot help asking—and confine itself to logic and the Analysis of Language? Only if we insist that philosophy must not modify its method. And why should philosophy not change its method to suit its problems, instead of changing its problems to suit its method?

The answer will be that the problems themselves are insoluble, because they are constituted not by matters of fact but by matters of feeling, and only matters of fact can be known. People say this because they believe that only our thoughts can be rational. They think our feelings and emotions are irrational, and tell us nothing about the nature of the world, but only express our reactions to it. This is itself a traditional philosophical dogma, which I see no good reason for accepting. If our thoughts are sometimes irrational, why should not our feelings sometimes be rational? If ideas in our minds can tell us something about the structure of the world when they are properly thought, why should not our feelings, when they are properly felt, do the same?

After all, the sciences, which work by purely intellectual methods, are not the only expressions of human rationality, nor the sole repositories of



DESCARTES, the "father of modern philosophy", lived in France and Holland 1596-1650. His philosophy was called Cartesianism—he was also one of the great mathematicians and founder of what is known as Cartesian Geometry.

human discovery and human wisdom. Art, in all its forms, perhaps especially in poetry; and religion in all its varieties, contain rich resources of vision, insight and illumination, gathered up through centuries of human experience and human reflection. What they have to teach us—and it is much, and more essential to us than anything that science can offer—comes primarily, if not exclusively, from emotional experience, clarified and purged from subjectivity and self-centredness by its own emotional discipline. Philosophy cannot accept this, any more than it can accept science, uncritically. But to disregard it, on the ground that it is mixed with emotion, would seem to be evidence of emotional bias rather than of intellectual acuteness.

It would take too long to follow out this alternative and to show its connection with the changes which have taken place in the maps of the world which philosophers have made as the centuries have passed. But I do want to say in closing one or two things about these changes. We saw that there were two sets of problems for philosophy—one concerned with what we should do, the other with what we can know. But the philosophical map must include something that lies behind both sets of questions—ourselves. For it is we who perform the actions that are right or wrong, and form the ideas which are true or false. For this reason, the central problem of all modern philosophy has been the problem of the Self. What am I, with my activities of knowing and acting? What is my relation to the world which I know and in which I act?

The picture of the Self in relation to its world of experience has, in modern times, been closely bound up with the progress of science. Up to the present our civilisation has been engaged on the *theoretical* task of gathering and organising scientific knowledge. Correspondingly, philosophers have been chiefly concerned with the Self in its theoretical activity as a Knower. Philosophy has been dominated by the problem of knowledge. But now, as Dr. Mannheim has shown us already in this book, we are passing from an unplanned to a planned society. Our civilisation is preparing itself for the *practical* task of using scientific knowledge. This is the real clue to the revolutions and wars of today. We can expect, therefore, that philosophy will show a corresponding transformation, and will find its centre of interest not in the Self as Knower, but in the Self as Doer. It will be dominated,

KANT—who lived in Königsberg, Prussia, 1724–1804. It has been said that "all philosophies since Kant have been built out of the ruins of Kantian philosophy"



not by the problem of knowledge, but by the problem of action.

The first sign of this has been the spread of Pragmatism, especially in America, with its central doctrine that "Truth is what works". In Pragmatism the interest is still in the nature of knowledge or truth; but knowledge is referred to action as its criterion and meaning. This tendency is carried a stage further in the Marxist philosophy. Marxist theory—sometimes called Dialectical Materialism—insists on "the unity of theory and practice", and emphasises the relation between the changing forms of society and the changing types of philosophy which they produce. Besides this, Communism seeks to *use* philosophy as an instrument of social action—of revolution and reconstruction. The final stages of this transformation of philosophy are still to come.

Within the old preoccupation with the Self as Knower, we can trace a relation between the stages of progress in science and successive changes in the philosophical map of experience. Science has been developed in three successive stages, two of which have been brought to maturity, and one which is still in its infancy. First, the foundations were laid on the *physical* sciences,

which are concerned with the material substance of the world. During that period philosophy tried to fit the Self into the picture by thinking of it as a "Substance", on the analogy of Matter. The second stage of scientific progress was the development of the *biological sciences*. Philosophy passed correspondingly into a second period in which the idea of the Self as a "thinking substance" was replaced by the notion of the Self as a "conscious organism". This phase has lasted to our own day, and most modern philosophies, popular and unconscious, as well as conscious and professional, are dominated by the idea of "organic" relations and are rich in biological analogies. But the reaction against this "organic" philosophy is growing in strength, which shows that this period, too, is drawing to a close.

The final stage in the creation of science has been reached in our own day, with the foundation of the *psychological sciences*. This does not mean, of course, that scientific progress has reached its limit. On the contrary, it is still only in its early stages. But when we have got properly established sciences covering the material world, the organic world and the world of human behaviour, there is no other field of observable phenomena for which new sciences need to be created. The psychological sciences, such as pure psychology and sociology, are still young and unsure, but they are on the right road at last, and there is no doubt that they have a great future before them. Perhaps their most important influence so far has been in persuading us to look squarely at the tangle of our own motives and emotions, and to discover how very little we yet know about the structure of our own inner life. This new knowledge of ourselves which the psychologist is bringing to light will be of great importance as we try to use science sensibly, not for mutual destruction, but for the benefit and enrichment of the human brotherhood. As Dr Glover said in Chapter 13: "The psychologist finds that even the irrational parts of our minds have a natural order and a complicated pattern. The more we understand the workings of this pattern, the less we shall fear it. The less we fear it, the more objectively we shall face the real problems of life."

But we shall need also a new philosophical map of the world into which the discoveries of scientific psychology can be fitted. The final stage of scientific development will, we may guess, be paralleled by a new period of modern philosophy, in which the Self is no longer pictured by analogy as a "substance" or an

“organism” but in its own nature as a *person*. And the personal self will be seen in relation to a personal world—to a community of persons who *act* co-operatively through the knowledge that science and philosophy together have provided. Whether this guess turns out to be a good one or not, there can be no doubt that we are at the beginning of a new and exciting chapter in the history of philosophy.

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The beginning of the Modern World—the decisive break with medieval life Martin Luther making his famous declaration at the Diet of Worms 1521

either with confidence or with effect. So, far from providing leadership for the world in its present problems, religion seems to be everywhere on the defensive, fighting a losing battle for an acknowledged place in the new social order that is shaping itself—or even for its very existence. This is a remarkable fact,

JOHN MACMURRAY

RELIGION IN TRANSFORMATION

Where there is no vision the people perish

Looking through the many admirable chapters in this book about "This Changing World", one is struck by the absence of anything much about religion. This is surely remarkable and symptomatic. Or perhaps one is not struck by it, and that is equally remarkable and symptomatic. In the past religion has always played a part, and usually a leading part, in all the processes of social change. If we go back to the beginnings of the modern world, we find that the decisive break with mediaeval life was made by the Protestant Reformation. In our own British history we find that till quite recently religion was a predominant factor in our social progress. Our democracy was established in a struggle for freedom of conscience in religion, and the Puritans were the backbone of the Parliamentary army in the Civil War. The peculiar form of the unity of Great Britain was fixed by the successful resistance of the Scottish Presbyterians to the attempt to establish episcopacy in Scotland. The struggle between Protestants and Catholics in Ireland determined the character of Anglo-Irish relations down to our own day. The "non conformist conscience" was the backbone of the nineteenth century liberalism, while the Methodist movement probably prevented a revolution, and certainly played a large part in the rise of the Labour movement and formed the character of the British Labour Party. Yet today, when we are in the midst of the most far-reaching social changes that history has known, religion seems to be left out. It comes into our discussions as an afterthought, for completeness' sake, as it were. It does not force itself upon our notice as one of the forces which are producing social transformation, nor does it attract our attention by any very significant changes at work within it. And religious leaders, though they are beginning to insist that the Church should have something to say, seem to find difficulty in telling us exactly what it is, and in saying it



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either with confidence or with effect. So, far from providing leadership for the world in its present problems, religion seems to be everywhere on the defensive, fighting a losing battle for an acknowledged place in the new social order that is shaping itself; or even for its very existence. This is a remarkable fact; and if we do not at once see how remarkable it is, that is perhaps more remarkable still.

For, of all the social changes of our time, the most fundamental and far-reaching, as well as the most obvious, is the decline in religious practice and the decay of religious belief. Taking the world as a whole, it is not too much to say that in the last generation atheism has spread like wildfire; and it is most advanced in the countries which have changed most. The Russian revolution converted millions of people to atheism almost overnight, and established, as the spearhead of the world revolution of our time, the first anti-religious form of society that the world has ever seen.* All over Europe, as well as in the Far East, the organised progressive movements tend to be anti-religious in principle, while even in England and the United States, least shaken as yet by the forces of change, the collapse of religion proceeds apace by less spectacular but perhaps more insidious processes of neglect and forgetfulness. Even in this country one finds devout Churchmen discussing the chances of the survival of Christianity; and if Christianity cannot survive, what chance is there for any of the other religions of the world?

** [Editor's note: It has recently been announced that the Russian Government's attitude to religion is being modified and that agreement has been reached to set up a Holy Synod]*

Does this mean that the great changes which are taking place in human society involve the disappearance of religion altogether? Is religion, as the modern Communist asserts, something that belongs to the primitive stages of history, and which is destined to fade away before the spread of knowledge and enlightenment? Is it an elaborate form of superstition, born of ignorance and helplessness—a wish fulfilment of human childishness? If we are to discuss the effect of this changing world of today upon religion, these are the questions we must answer. But the answers, unfortunately, can only be an expression of opinion, and the best I can do is to state my own conclusions, and indicate the reasons I have for drawing them. Others whether they are religious or anti religious, will take other views for other reasons. Only the future itself can finally decide.

It seems certain to me that religion cannot disappear, but also that it cannot survive without transformation. For this judgment I have three main grounds. First, there is an aspect of the human spirit that finds its expression in religion, and would have no form of expression if religion were to go. This is a *subjective* ground of conviction. Second, there is an *objective* ground in the fact that there is an aspect of our relation to the world around us, fixed for us by the structure of the world, with which religion deals. Lastly, there is an essential function in society which religion performs, and which only religion can perform satisfactorily. We had better consider these three aspects of the question separately and in succession.

The subjective aspect of religion is the one with which we are most familiar, indeed, there is a strong tendency to see this aspect exclusively, and to overlook all the others. We recognise easily that there is something in the make up of human beings which gives rise to religious feelings and religious ideas. Almost without exception human beings experience the sentiments of awe and reverence, with their curious intermingling of love and fear, and these feelings tend to find expression in an attitude of worship and adoration. Whatever excites these feelings in us gains a special character of *separateness*. It is different from the things we ordinarily meet and deal with. It is above and beyond normal experience, and must be treated with humility and respect. It is somehow both intensely real and yet un-natural. It is beyond our power and our wit to cope with, and so it stands in sharp contrast to the world of normal experience, to which we are

The Puritans were the backbone of the Parliamentary army in the civil war. Fairfax wrote the following report to Parliament after the Battle of Naseby

The horse all quitted the
fielde; and were pursued, within three
miles of Leicester. Their Ammunition,
ordnance, & Carriages, all taken. All
that I desire is, that the honor of this greates
never to bee forgotten mercie, may bee given
to God in an extraordinary day of thankes
givinge; And that it may bee improved to the
good of his Church, & this Kingdom: wh. shall
bee faithfullie endevoured by: sr

Harborough
June 15. 1645

Yr most humble
servant
Tho: Fairfax

The horse all quitted the fielde (l. fielde); and were pursued, within three miles of Leicester. Their ammunition, ordnance, and carriages, all taken. All that I desire is, that the honor of this greates and never to bee forgotten mercie, may bee given to God in an extraordinary day of thanksgivinge (sic), and that it may bee improved to the good of his church, and this kingdom; what shall bee faithfullie endevoured by: sr.

Harborough,
June 15, 1645

Your most humble
servant
Tho. Fairfax

adapted. It seems sublime or sacred or holy. The experience itself we tend nowadays to refer to as "mystical", and people in whom it is common and dominant we call "mystics". But we should not allow ourselves to be misled by this into thinking that this "mystical" experience is peculiar to a small number of queerly constituted people. In the mystics it is highly developed, and pretty constant in its occurrence. But it is only different in degree and not in kind from something that we all experience less frequently and less powerfully. For all normally constituted people there is something that they reverence, something that is sacred and not to be violated. A simple proof of this is the dislike we feel for people who are lacking in reverence and respect for the things that we consider sacred, the nasty tribe of scoffers and jeerers and cynics, the people to whom nothing is sacred.

A great deal of careful study of the psychology of religion has been a feature of the last generation of research. In this field Professor Otto's book on "The Idea of the Holy" was epoch making. It drew attention to the psychological origin of religion in the structure of the human emotions, and so showed that religion in some form or other was rooted in the universal nature of human consciousness. But for our immediate purpose the work of Freud in this field is even more noteworthy. His psycho-analytical researches led him to the view that religion was due to the persistence of childish experience in grown up people. In our earliest years we are helplessly dependent for the supply of our needs upon the love and care of our parents. The father is the great ruler of the child's world, both stern and kind, infinitely wise and powerful, the source of all good and evil. Freud believed that when we grow up we tend to retain this picture and the attitudes and emotions which are appropriate to it, and since they will not fit the facts of adult experience, we tend to project the picture upon the world at large, with God as the universal Father, endowed with all the powers and qualities that we imagined our earthly father to possess when we were very young. We do this because secretly we feel unable to cope with the real world, and long to be back in the protection and comfort of the old home. So man invents religion as a fulfilment of a secret and unconscious wish for the security and happiness of his days of childhood.

This theory fits in very well with the Communist explanation of religion. Communists believe that religion is a mark of human immaturity. Until science developed our control over Nature,

they say, we were indeed unable to cope with the world in which we lived. But now that we have developed such a power of production that we have no need to fear Nature, and are able to use the world successfully for the supply of our needs, this humble dependence on forces which we cannot control is out of place. Indeed it is dangerous to progress, because it helps to conceal from us the powers we possess, and to make us unwilling to use them, and it serves the purposes of those who have a vested interest in the old world of scarcity and poverty and powerlessness for the many, because it makes the masses willing to suffer patiently the privations which they have learned to think inevitable, and to be humble and reverent towards their rulers. Religion was always an illusion, the Communists believe. In the past it was a natural, and even a beneficent illusion, now it is a dangerous illusion. Not only is it fated to die out as the human race grows up, it is important that we should take active steps to dissipate it by educating men out of it.

Now these theories of religion have a measure of truth in them, though the evidence on which they are based is very inadequate. They are plausible so long as we think only of the subjective aspect of religious experience, and imagine that religion is wholly produced by psychological forces. This our own age tends to do, as I said. The reason is that we are so largely taken up with the effort to master the material world—with machinery and technique, with science and organisation—that everything else seems subjective, mystical or illusory. Yet even if we were successful in these efforts beyond all reasonable hope, we would still be dependent upon Nature, there would still be plenty of frustration and helplessness and unhappiness in our human lot. The notion that science and organisation can make us completely free, completely masters of our destiny, is itself an illusion, quite naturally born in the minds of a generation which has witnessed the magnificent triumphs of science and invention that are the miracles of our time. Even if Freud and Marx were right, their theories would give no ground for thinking that religion will now die out. For the feelings which give rise to religion will still be present in us, and the conditions of life which call them into active function will still be there. At most we could hazard the guess that the coming application of science to the solution of the material problems of existence will result in a change in the *form* of religion. Soon a new generation, grown used to the new age that scientific knowledge has produced, will be more impressed



"Men have worshipped strange things, but always in doing so have personified and endowed them with super-normal powers"

One of the forms in which AMIDA is worshipped by the People of JAPAN and TARTARY.

(from Dr. Hurd's "Religious rites and Ceremonies of all nations")

by what science cannot do than by what it can ; and it is highly probable that then they will turn from science to religion as they have now been turning from religion to science.

But if we consider the objective aspect of religious experience, which is for the moment less in evidence but in the long run far more important, these theories cease to be even plausible. The emotional capacities of man do not exist and have not developed in a subjective and private vacuum. They have been evolved in a long process of adaptation to the actual world in which he lives. No doubt our feelings may lead us to imagine things that do not exist, and to people the world with these fancies. Fear in particular has the tendency to stimulate this projection of fanciful images upon the outside world. But these emotions themselves are produced in us by the realities of the world. If there were no objects in the world to fear, we should never feel fear, and the unreal fancies themselves would never arise. So with the feelings which underlie religion. We may worship objects of our imagination. But the feeling of reverence itself cannot be illusory.

There must be something in the world to reverence, which has produced this feeling in us, and to which it is the proper response. Religion is at once the oldest and the most universal form of human reflection and human culture. It has had an objective development of its own with a definite shape and direction which is open to study. No people, however primitive, is without it. Moreover it has been the general matrix of all other forms of culture ; of science and philosophy no less than of art and literature. There must be something quite fundamental and quite universal in the external conditions of human life to account for this. There must be some factor in the human environment to which religion is the response ; and since science and art are first developed within religion, it would seem that this factor must somehow embrace and contain the factors to which these more specialised departments of reflective life are directed. It is not a sufficient explanation of science to say that it is man's attempt to satisfy his feelings of curiosity. So is gossip. We must also indicate the appropriate *object* for the curiosity which provides the subjective impulse. Equally, it is no proper account of religion to indicate the emotions which it satisfies. We must also discover its appropriate object. The scientific impulse of curiosity produced plenty of organised illusions before it found its proper object and its proper method. It wandered in the mazes of magic, of astrology, of alchemy and many another. It may be that religion is still in the stage of wandering, and has not yet found its true object and its appropriate method. Even so, the persistence of the groping search from far beyond the beginnings of history would give us ground for believing not that religion is an illusion, but that its triumphs still lie in the future, when it has found its true form. Now we cannot worship anything we please. We can only reasonably worship something *real* that excites our sense of awe and reverence. To produce this feeling, it must have two characteristics, which are perhaps two aspects of the same thing. It must be *above* us ; beyond our control and our full comprehension ; and also it must be congruous with us, of our own nature, and so *personal*. Everything that we know in the world which is not personal is below us in the order of Nature, and it is clearly irrational to worship anything lower than ourselves. True, men have worshipped strange things,—stocks and stones, trees and animals, cities and countries, sun, moon and stars and the forces of Nature, but always in doing so they have personified them or treated them as if they were persons and have imagina-

tively endowed them with supernatural or supernormal powers which in fact they did not possess. They have worshipped mortal beings, but usually when they were dead, or when they were kings or rulers or endowed with some seemingly more than mortal authority. In these cases, too, they have endowed them with qualities they did not, and could not have. The religious term "God" is the name for the proper object of reverence, since it means that reality which is at once personal and beyond us, and the capacity for reverence in the structure of human nature is thus itself a strong argument for the *existence* of God. We are not concerned here with this question. It is the existence of *religion* that we are discussing. But if anyone should think that such an argument makes God "subjective"—a produce of the human mind—he should reflect that the "scientific" infinities, such as Matter or Energy or Electricity, are in exactly the same situation so far as our knowledge of them is concerned. Their existence, too, is *inferred* from our direct experience of limited and particular situations.

The necessity of the search for a real object of absolute reverence can only be seen from the practical point of view. The formation of character is a process of integration. We have impulses and desires which pull us this way and that, and which have to be unified, and they can only be unified—and we can only become true *individuals*—by an orderly subordination of our desires and of the emotions from which they spring. There must be something that we value more than everything else, and to which, if need be, we will sacrifice everything else. Whatever it is, it is sacred to us. It is the thing for which *in practice* we have an absolute reverence. So we talk of a man "worshipping" money, or fame, or even "making a god of his belly." Now this is an entirely proper way of speaking. The true object of any man's religion is that which he values absolutely, and what it is can only be shown by discovering what it is to which he is prepared, in the last resort, to sacrifice everything else. In this fundamental sense every man has a religion, and if the object of his practical worship is the wrong one, if he is wrong in thinking that it is of supreme value, if it is not objectively sacred in itself, then he practises a false religion. Its falseness is a *practical* falseness. It cannot do what he expects from it. It cannot, in the nature of things, give wholeness and satisfaction to his personal life.

This practical need for a fixed centre of value has a character



The sermon on the mount.

One of the great creative moments in world history—the famous painting by Breughel

which introduces the third ground for believing that religion cannot die out, which is that it performs an indispensable social function. We may set our hearts on what we will, but when it comes to the business of practical life we are bound by the reality of the world outside us. Our efforts will be senseless and futile unless we value most what is inherently most valuable. We have noticed already that what is highest in the order of Nature is necessarily personal. It follows that to order our lives properly and satisfactorily we must value persons above all else and sacrifice or subordinate everything else to them. This is what people mean when they talk of the "infinite" or the "absolute" value of personality. Only persons are a proper object of reverence; and every person has a rightful claim to be treated with reverence. In other words, the problem of our relations to one another is the primary problem of practical life and is the key to all the other problems. If we order our relations to one another properly, other problems will fall into place and be soluble; if we fail here,

vides the indispensable implements and techniques for doing the job. But that does not mean that we will do it, or even that we are the sort of people who *can* do it. If we cling to the old familiar ways of life, if we are afraid to change our habits and our ideas, if our imaginations are too sluggish even to conceive a world much different from the one in which we have been brought up—then we will only be able to use Science to *prevent* the unification of mankind, and to destroy one another, very scientifically, in an effort to preserve our traditions. It is the function of Art in all its forms to stir our sleeping emotions, and to bring our imagination to life. Art is creativeness, and it awakens in us the creative impulses and the desire to make new things in new ways. It gives us visions of what is lovelier than we know in our ordinary lives, and excites in us the wish to achieve something more satisfying than we are accustomed to. Unless we are stirred in this way to imagination and creativeness, the vast inertia of custom and habit will paralyse our will to use science for creative purposes, and we will act only fearfully, defensively and under the compulsion of necessity.

But neither Art nor Science can touch the root of the difficulty. Art can develop the impulse to creativeness, and Science can provide the means of creating. But the realisation of community is another matter. For this is a question of the relation of man to man, in their essential humanity. Human beings are, as it were, the raw material of the world community. But they are also the makers of it. The scientist and the artist both work with materials which they can use *for their own ends*. When we use a scientific method we manipulate matter and make it into something that will serve our needs. When the artist in us is at work, we use our materials to make something that expresses our own ideas and visions and emotions. But in both cases we are masters of the material, and it is the servant of our will. Neither of these ways of acting can make a community. For if we treat other people as materials which we can fashion or manipulate as *we* please, they will naturally retaliate by trying to use *us* for *their* purposes. The result can only be a struggle for power. Hitler is perhaps the best example in history of a man trying to create a community under the drive of the artistic impulse, and using science as his instrument. It seems clear now that he did set out with the idea of creating a world community. But he thought of himself as an artist, realising his own idea, and expressing his own private vision. Consequently he had to treat everybody else as his

everything else will inevitably go wrong. This is the primary law of life, and it is an inexorable law of Nature, as fundamental as the law of gravitation.

It is out of this universal practical problem of human relationships that religion arises, as science arises out of the practical problem of our relation to the material world—to the world that need not be revered, but can be used with impunity for our own purposes. But we cannot treat human beings "scientifically" with impunity. If we try to use other people for our private ends, as though they were things, we are treating them as if they were what they are not, and the result is disastrous. For we compel them to be our enemies, to fight us for their own freedom of action, and so we create conditions which prevent co-operation in peace, in every field of human activity. We create fear and anger and resentment, and destroy the basis of friendship. The function of religion is to discover, create and sustain the conditions of satisfactory human relationship. That is why religion always talks in personal terms about personal relations, about man's relation to God—that is to say, about the relation of finite persons to infinite and eternal personality—about enmity and reconciliation, about love and brotherhood. That is why its organisations are "communions", and its rituals are rituals of communion. Religion, in other words, is about community, and the pre-eminence of Christianity as a creative force in history lies in the fact that it realised the function of religion in its full, universal scope, as the creation of a universal community, a brotherhood of all mankind, and realised it not as an idea to be believed or as a sentiment to be cherished, but as a task to be achieved.

We have reached a point in history where men everywhere are beginning to think of the making of a world community as a practical necessity. (Science, too, is at present laying more and more emphasis on group activity, group psychology, and group consciousness.) The development of this conviction lags behind the march of events. It is a matter of life and death already. The alternative is universal frustration and bigger and more terrible wars. But we have hardly begun to discover what is involved in the task of unifying mankind. We do realise that Science has made it possible. But we have still to discover that Art and Religion have even more essential parts to play. Science makes the world community possible only in the sense that it pro-

vides the indispensable implements and techniques for doing the job. But that does not mean that we will do it, or even that we are the sort of people who *can* do it. If we cling to the old familiar ways of life, if we are afraid to change our habits and our ideas, if our imaginations are too sluggish even to conceive a world much different from the one in which we have been brought up—then we will only be able to use Science to *prevent* the unification of mankind, and to destroy one another, very scientifically, in an effort to preserve our traditions. It is the function of Art in all its forms to stir our sleeping emotions, and to bring our imagination to life. Art is creativeness, and it awakens in us the creative impulses and the desire to make new things in new ways. It gives us visions of what is lovelier than we know in our ordinary lives, and excites in us the wish to achieve something more satisfying than we are accustomed to. Unless we are stirred in this way to imagination and creativeness, the vast inertia of custom and habit will paralyse our will to use science for creative purposes, and we will act only fearfully, defensively and under the compulsion of necessity.

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material, as his medium. They must have no chance to realise a vision of their own, no spontaneous creativeness. They must be passive in his hands and act as he directed them. He would be the world-dramatist, and the people of the world would be the actors in the drama he had conceived and on the stage which he would set. He has failed ; and he was bound to fail, because the world is not made like that, and human beings are not robots, and can't make themselves into robots even if they want to. We have lived through the drama which Hitler opened almost to its close ; and now we can see that it is not Hitler's drama, and that it moves to a finale that neither he nor any man conceived. We can see that Hitler was only one of the actors occupying for a while the centre of a stage which was set for him, and soon now to make his exit. We can see, too, that his attempt at world unification was doomed to failure, and that any man or any nation which followed the same road would meet the same fate.

What is wrong with such an attempt at world community is that it is completely irreligious. There is no reverence in it, no respect for persons. We saw that reverence is not merely a subjective emotion, but an adaptation to reality. People without reverence are blind ; they do not understand the nature of things, and so they destroy themselves. They have no humility, and no sense of proportion in their relations to one another. Since they do not respect one another, they cannot be respected, and in the end they cannot respect themselves. A society of them, if it could exist, would be a collection of megalomaniacs ; not a community, but a madhouse.

The making of a community is neither a scientific nor an artistic business. We can "make" a community only in the sense that we can "make" friends ; and the conditions of community are

ing to love our enemies. Only so far as this is achieved can there be a community of mankind, in which all are united in freedom, and treated as equals. It cannot be engineered, nor can it be created by the genius of gifted individuals. It is a mutual achievement consisting in the achievement of universal mutuality. I can see no possible alternative to religion as a means of achieving it, however much I may doubt the capacity of the existing religious agencies to do so. Indeed any agency which existed to achieve it would by that very fact be a religious agency. If it were not, how could it possibly succeed, or even realise the conditions of its success?

These then, in brief, are my main reasons for thinking that religion cannot die out. Indeed if we take the widest view of the social changes now going on, we can hardly escape the conclusion that they are the beginning of a process which must eventually create a single world community, and since this, as I have tried to show, is the essential social function of religion, the need for religion is greater than ever before, and will increase rapidly. The reasons seem to me to be quite conclusive. But if they are, what are we to make of the rapid and obvious decline in religion, and even the passionate detestation of religion by the leaders of progressive movements? My own answer is this. *The decay of religion is the first stage in a transformation of religion which will fit it for the great task that lies ahead, the creation of the world wide human community.*

The form of our religion today is still *dogmatic*. It still looks upon the truths which it preaches as guaranteed by a past revelation, as certainties to be defended. Consequently its practical effect is traditional, conservative, backward looking. It tends to preserve the old ways of life, the old attitudes of mind, the old forms of social organisation. Before the community of mankind can be formed, this state of mind must be replaced by a forward looking, experimental attitude in the people of the world. Until we are all looking with hope and expectation for the new world, there can be no decisive advance. The first need is not that the truths enshrined in the Church's tradition should be given up. Some of them are not merely essential to the present crisis, but also are nowhere else to be found. It is that they should cease to be asserted as dogmas, or believed in a dogmatic form. Science alone has fully realised the necessity for this change of mind. Its truth is not something possessed and guaranteed, but some

thing to be *discovered* by patient search and experiment. Its values are in the future. This makes it a creative force for the transformation of society, and the conflict between science and religion, the attempts to substitute science for religion, are at bottom conflicts between these two attitudes of mind, the dogmatic and the experimental. It is not *what* they believe that brings science and religion into conflict, but *how* they believe it. The withdrawal from existing forms of religion is combined with a growing sense of the need for religion, only it can't be religion as we know it. And this withdrawal of support from traditional religion is a necessary preliminary to a transformation of the religious form.

Does this mean the end of Christianity? On the contrary, it means the re-discovery of Christianity. What *we* call Christianity is a religious tradition formulated in the Middle Ages and expressing the mind and the social structure of mediaeval society. The early Christians conquered the Roman Empire without a theology, without a tradition, without even a New Testament, in the passionate expectation of the catastrophic destruction of the world in which they lived and the coming of the Kingdom of Heaven in its place. It is that passionate attitude of mind that we need today, and the need is so urgent and so deeply rooted in human nature, that I at least cannot doubt that the necessary transformation of religion will be accomplished. At first sight it looks as though the transformation of other departments of social life, so well described in "This Changing World", has left religion alone unchanged. If I am right this is not so. It is, indeed, in the religious field that the greatest and most fundamental changes are taking place, even if for the moment they are mainly negative.

and particularly to those dealing with the sociological aspects of our changing world. One fact emerges clearly from the discussion. For the first time in his long evolution, man has the opportunity consciously to control his destiny. Consciously—that is to say, rationally, or scientifically. Such is the meaning of the new and wider interpretation which in recent times has been given to the concept of planning. But the difficulty—or, as we may say, the element of obstinate doubt—arises from the certainty that whole aspects of life are outside the scope of planning. We cannot plan art and we cannot plan religion. Indeed, in a general sense we might say that we cannot plan anything which has roots in man's unconscious. More simply, let us say that we cannot plan the moods and emotions of the human heart. Faced by this fact, a certain type of scientific planner would like to eliminate this wayward organ, but there is no doubt it has represented symbolically throughout the ages a vital element in life—those human needs which, as Dr Mannheim and Professor Mumford both emphasise, have been frustrated by some of the technical and scientific developments described by other contributors.

The more enlightened planner, therefore, proposes to plan the new society so that outlet and scope are provided for these spontaneous expressions of vitality. But nothing will disguise the fact that "planning for freedom" is a phrase which evades an unresolved paradox. It is not sufficient, for example, to allow time and leisure, money and materials, for an irrational activity like art. Art is not a part-time activity in a vital civilisation—it is not a separate or separable activity. It is the bloom on the ripe fruit—essentially the by-product of a healthy organic process. And just as the scientists who have planned to produce bigger peaches and rosier apples have sometimes succeeded in their aims but only too often left us with a flavourless pulp, so there is a danger that all our rational planning of society may give us homes fit for heroes but nothing to be heroic about, security from every disease except boredom, plenty in the land but a platitudinous emptiness which spreads like a leprosy over the mind.

I must confess that I have an obscure distrust of the scientific planner with a purely intellectual or rational approach to life, and for that reason I would beg the reader to meditate with at least as much attention on an alternative attitude towards life. It is an attitude which embraces all those elements in our mental make-up which find expression in religion, poetry, music and the arts.

generally. Art is not wholly irrational—I think our contributors make that clear enough. Nor, argues Professor Macmurray, is religion. But neither can politics be wholly rational. Let us remember always that what we call liberty, and even what we call democracy, was not planned. It all began as a kind of intuitive mysticism, a faith for which many men gave their lives. Men will not give their lives for a blueprint. But unless we have a faith for which men will give their lives, we are already dead.

We shall have faith. We shall have mysticism. When every river is a straight canal, when the trees are dressed in regimental lines, when the trains are punctual in Spain and the very waves of the sea are part of a plan, the clouds will still straggle in ragged majesty across the intricate sky, and in the mind of man darkness and terror, storm and stress, joy and sudden enlightenment, will still maintain their fickle alternations. Such are the dialectics of Nature—of that total Nature which includes the mind of man among its organic manifestations. That mind is an awkward fact to accommodate in any political synthesis—Dr. Glover has called it an anachronism. But unless it is accommodated, any attempt at social stability is doomed to failure.

It will be said that what we need is a new religion, or perhaps a revival of the old religion. On that suggestion I would like to repeat the words of Charles Peguy, who was a Christian, a hero, and a poet. He once wrote: "A religion is necessary for the people"—this is, in a certain sense, the deepest insult that has ever been offered to our faith. Without sharing Peguy's faith we may nevertheless sympathise with his protest. To assume for one moment that religion is a kind of patent medicine, to be prescribed for social ills, is to misconceive its essential nature. Religion, like art, is nothing if not spontaneous, or rather, since that word suggests an enthusiasm or revivalism not characteristic of *real* religion, let us say that it is nothing if not organic—part of our human make up which, as John Macmurray shows, since it cannot be eradicated, must be transformed. But the process of transformation must itself be organic, a natural growth and not a dogmatic plan. Whether we are speaking of religion or of art, it is essential to realise that they are not *plans*. They are *processes*, and the scientist can contribute nothing of real significance to their elucidation or elaboration.

The view that religion has declined proportionately to the growth of enlightenment is at least true quantitatively as Macmurray adds:

Qualitatively, the religion of a Newman or a Peguy may be as profound as the religion of any earlier mystic. The same ratio is not true of art in the same degree. Personally, I do not believe that any subsequent period of art in Europe has reached the level of the twelfth and thirteenth centuries. But as compared with, say, the seventeenth century, the painting of the nineteenth century was undoubtedly enhanced by the scientific enlightenment of the intervening period. Impressionism is a direct product of the scientific understanding of light and colour. The great advances now being made in the art of architecture which Mr Summerson describes are also to a considerable extent directly dependent on technical advances. But these, and other examples I might mention, suffer from their partiality, their departmentalism. Our period does not achieve a unity of æsthetic expression such as the Gothic did, and that is the measure of its cultural inferiority. It may be if we achieve a satisfactory measure of scientific and technical progress such as we have found possible to predict in this series, that then something in the nature of a crystallisation will take place. Man, conscious of his material achievements, will discern some overriding purpose or design in our plans, some divinity in our ends, carefully contrive them as we may.

Some synthesis which embraces both art and science is the final necessity. It will not give us stability—there is no stability in this changing world. Death itself is a process of change, and to seek rest is to seek nothingness. What we should seek is the quality of efficiently travelling bodies—the evenness of the ship's keel, the equilibrium of the rotating wheel, the libration of wings in flight in one word, *poise*. The same need is often expressed by the world *integration*, the making whole of what is unhappily separated and disparate. The individual, we say, must be integrated with the community. But integration is not a mechanical process, it only takes place in a certain atmosphere, under a certain pressure. *Such favourable conditions are provided by a common faith, a universal religion, a revolutionary fervour.*

One such integration is proposed by the doctrine of dialectical materialism. The origins of this doctrine are philosophical. Hegel derived a certain logical theory from Plato, this theory was "turned upside down" by Marx, and so passed into the ideology of a political party. Dialectical materialism is a philosophy of life. It is a reconciliation of opposites, a synthesis or integration such as our world requires. But it is significant that it is almost

brief phases of wild agitation. Such erratic behaviour may be an inherent characteristic of our universe, and beyond human interference. But when, as at present, the human race finds itself in a period of violent oscillation, when the speed of change is accelerated and the spirit of adventure inflames the human mind, then it is that we must hold on most firmly to our controls—to a philosophy which gives us direction and to a vision which sustains us.

SOME BOOKS

Some of these books cost as little as 9d and some are more expensive. The list does not pretend to be exhaustive and does not demand much technical knowledge in the reader; it has been compiled mainly by asking each of our authors to make a few recommendations and comments, and includes some of their own more popular works. It is difficult to buy books nowadays, owing to wartime restrictions, but if you cannot buy some of them you can certainly consult them all in a good reference library.

The editor of "This Changing World" has marked thus • a selection from this list for which he suggests priority, but all of them are interesting

SCIENCE

- Bernal, J D **THE SOCIAL FUNCTION OF SCIENCE**
An examination of the part science must play in society, reveals the scope, method and purpose of modern science—the best full length statement of the relation of science to other aspects of civilisation—one of the most important books written of recent years. Rather long but fascinating once you get into the swing of it.
Routledge
- Crowther, J G **THE SOCIAL RELATIONS OF SCIENCE**
Another discussion of the same subject, but taking much of its material from the past development of science, so that it forms a good introduction to science's history.
Macmillan
- Whitehead, A N **ADVENTURES OF IDEAS**
The finest book of our leading philosopher
Cambridge University Press (also Penguin)
- Whitehead, A N **SCIENCE IN THE MODERN WORLD**
Shows how the developments of modern science have affected the metaphysical view of the universe.
Cambridge University Press (also Penguin)
- Waddington, C H **THE SCIENTIFIC ATTITUDE**
A much slighter work than the others mentioned, but has a section on the relations between science and the arts—lively reading.
Penguin

- Baker, J R **THE SCIENTIFIC LIFE**
 Gives the opposition point of view, emphasising the danger that planning may get out of hand and lead to totalitarianism, and that science may destroy the traditional "cultural" values
Allen & Unwin
- Crowther, J G **SOVIET SCIENCE**
 The first book to be written in the English language on this important subject
Kegan Paul (also Penguin)
- Darwin C G **THE NEW CONCEPTIONS OF MATTER**
 The best attempt to express these in ordinary language
G Bell & Sons
- Eddington **EXPANDING UNIVERSE**
 Short, simple and fascinating
Cambridge University Press (also Penguin)
- Needham, J **ORDER AND LIFE**
 Contains a series of semi popular lectures in which the subject of the author's article in this book is discussed rather more fully
Yale University Press
- Needham J **TIME THE REFRESHING RIVER**
 The most recent collection of Needham's essays, in which the general implications of his line of thought are worked out
Allen & Unwin
- Russell Dugan Stewart **ASTRONOMY (two vols)**
 A splendid compendium of detailed information on modern astronomy
Ginn & Co
- Scheinfeld Amram **YOU AND HEREDITY**
 The best popular account of heredity
Chatto & Windus
- Spencer Jones **GENERAL ASTRONOMY**
 The best introductory handbook for the general reader
E Arnold & Co
- Thomson, G P **THE ATOM**
 A simple and authoritative account
Home University Library
- Waddington C H **HOW ANIMALS DEVELOP**
 A short popular account of the recent advances in embryology
Allen & Unwin
- Waddington, C H **ORGANISERS AND GENES**
 A more advanced treatment of the same subject
Cambridge University Press

PSYCHOLOGY

- Freud **INTRODUCTORY LECTURES ON PSYCHO ANALYSIS**
(Third English Edition 1937)
The most satisfactory and authoritative presentation
As the first German edition was published in parts in
1916-17 this book does not deal with Freud's later
discoveries as to the nature of mind
Allen & Unwin
- Freud **GROUP PSYCHOLOGY AND THE ANALYSIS OF THE EGO**
Although extremely condensed, this sets out the basic
principles regulating group life, all subsequent con-
tributions to the subject draw their inspiration from
this monograph
Hogarth Press
- Freud **CIVILISATION AND ITS DISCONTENTS**
Gives an extremely suggestive account of the relations
between man's instinctual stresses and the various forms
of social outlet they may secure
Hogarth Press
- Glover, Edward **PSYCHO ANALYSIS**
A comprehensive summary of psycho-analytical theory
and practice with special reference to the diagnosis and
treatment of psycho-neuroses, psychoses, psycho-general
disorders and social difficulties
John Bale
- Glover, Edward **WAR, SADISM AND PACIFISM**
An examination of the unconscious factors and mechan-
isms contributing to the outbreak of wars, and of the
factors responsible for the inefficiency of pacifist counter-
measures
Allen & Unwin
- Glover Edward **THE DANGERS OF BEING HUMAN**
An examination of various sociological phenomena
crime, war, politics, education and social planning, in-
dicating the difficulties and dangers man endures as
the result of unconscious interference with rational
adaptation
Allen & Unwin
- Glover, Edward **THE TECHNIQUE OF PSYCHO ANALYSIS**
An investigation of psycho-analytical technique with
special reference to difficulties commonly encountered
in its use
Baillière, Tindall & Cox
- Glover, Edward **THE PSYCHOLOGY OF FEAR AND COURAGE**
Written after the fall of France—a popular handbook
dealing with the rational and irrational fears incident
to the civilian population in wartime and analysing the
individual and social factors supporting national morale
Penguin Special

INTEGRATION OF SOCIETY

Berdyaev, N

THE END OF OUR TIME

A diagnosis of modern civilisation by a Catholic philosopher—gloomy but impressive
Sheed & Ward

• Cobban, Alfred

THE CRISIS OF CIVILISATION

Re-examines the foundations of society in the light of our present circumstances, and calls for a new basis in political theory
Jonathan Cape

Drucker, Peter F

THE FUTURE OF INDUSTRIAL MAN

Discusses the need for a social structure related to the existing industrial structure, and makes practical proposals to this end
Heinemann

• Fromm, Erich

THE FEAR OF FREEDOM

A psychological analysis of the deeper causes which make men afraid of freedom
International Library of Sociology and Social Reconstruction
London Kegan Paul

Ignazio Silone

SCHOOL FOR DICTATORS

A series of witty dialogues where the author teaches an American would-be Fuehrer how to do it
Jonathan Cape

• Lindsay, A D

THE ESSENTIALS OF DEMOCRACY

The best brief and penetrating interpretation of the English idea of democracy
Wm J Cooper Foundation Lectures London (Oxford University Press)

Lowe, A

THE PRICE OF LIBERTY

English Democracy seen through German eyes, with understanding of the powers making for co-operation and consensus in this country
Hogarth Press

Macmurray, John

THE CLUE TO HISTORY

The history of Christianity surveyed by a Christian philosopher Deals with the relation of Christianity to Communism and Freedom. Rather difficult to read but worth it
Student Christian Movement Press

Mannheim, Karl

IDEOLOGY AND UTOPIA

An Introduction to the Sociology of Knowledge
Kegan Paul

• Mannheim, Karl

MAN AND SOCIETY in an age of Reconstruction

Comprehensive study showing essential need of intelligent group integration for planned democracy An influential book
Routledge

- Mannheim, Karl **DIAGNOSIS OF OUR TIME**
A famous sociologist surveys the social changes of our time in education, planning and religion. A more popular treatment of some of the problems dealt with in his "Man and Society"
International Library of Sociology and Social Reconstruction
London: Kegan Paul
- Mannheim, K. (Editor) **INTERNATIONAL LIBRARY OF SOCIOLOGY AND SOCIAL RECONSTRUCTION**
A collection of volumes devoted to the study of society and to contemporary social problems
Kegan Paul
- Mumford, Lewis **TECHNICS AND CIVILISATION**
Deals with the relation of the machine to human living in its widest social implications over a period of a thousand years—a compendious and original book
Routledge
- Mumford, Lewis **THE CULTURE OF CITIES**
Shows how the development of cities through the ages has reflected the character of the civilisation of the time—good reading and wide ranging
Secker & Warburg
- Mumford, Lewis **THE CONDITION OF MAN**
This author's latest contribution, as interesting and comprehensive as the others
Secker & Warburg
- Rauschning **GERMANY'S REVOLUTION OF DESTRUCTION**
An undogmatic analysis of the destructive aspects of a totalitarian revolution
Heinemann
- ~ **A HANDBOOK OF MARXISM**
An omnibus volume which includes everything necessary for an understanding of dialectical materialism
Gollancz

ECONOMICS AND BUSINESS

- Bournville Village Trust **WHEN WE BUILD AGAIN**
A research into conditions of living and working in Birmingham, quite popularly presented, with proposals for post war
Allen & Unwin
- Burnham **THE MANAGERIAL REVOLUTION**
Marxist in method but most un-Marxist in conclusions; a theoretical, extremely valuable but perhaps slightly one-sided approach
Putnam
- Clark, Colin **NATIONAL INCOME AND OUTLAY**
An interesting survey
Macmillan

Crowther, Geoffrey **OUTLINE OF MONEY**
 Gives a cold modern and well-supported statement on what money means
Nelson

Drucker, Peter F **THE END OF ECONOMIC MAN**
 Also theoretical, less thorough than Burnham, but an excellent antidote to Burnham's one-sidedness
Heinemann

Knoeppel & Seybold **MANAGING FOR PROFIT**
 Argues the importance in Capitalism of making and working to management charts on profit and loss—an important book.
McGraw Hill

Metcalf, Henry C
 Ph D
 L Urwick, O B E,
 M C, M A, F I I A
 (Editors) **DYNAMIC ADMINISTRATION**
 The collected papers of Mary Follett on Industrial Group integration and leadership
Management Publications Trust

• Rowntree, B Seebohm **POVERTY AND PROGRESS**
 A social survey of York, a thorough and interesting example of the way to investigate conditions of life
Longmans, Green & Co

Whitehead, T N **LEADERSHIP IN A FREE SOCIETY**
 Argues on up-to-date evidence that sociological and psychological factors are of paramount importance in the management of modern industry
Oxford University Press

SOVIET COMES OF AGE
 By 28 of the leading citizens of the U S S R
 A book of essays by Soviet specialists written to commemorate twenty one years of the great Russian experiment
Wm Hodge & Co Ltd

DEVELOPMENT OF SCIENTIFIC MANAGEMENT IN BRITAIN
 An 85 pp brochure giving many interesting dates 1591-1936 in a survey prepared as a report for the British Management Council in 1938

THE ARTS

PAINTING AND SCULPTURE

Barr, Alfred **CUBISM AND ABSTRACT ART**
 A well illustrated survey of these modern movements by the director of the Museum of Modern Art, New York
Museum o

- Bertram, Anthony **DESIGN**
A series of broadcast talks discussing design in modern life
Penguin
- Martin Leslie,
Nicholson Ben &
Gabo Naum (Editors) **CIRCLE**
A striking book with many pictures illustrating the constructive movement in modern painting, sculpture and architecture
Faber & Faber
- Ramsden, E H **AN INTRODUCTION TO MODERN ART 1940**
A handy small guide to the modern movements
Oxford University Press
- Read, Herbert **THE MEANING OF ART**
A simple introduction to the history and theory of art
Faber & Faber
- Read, Herbert **ART NOW**
A comprehensive survey of modern movements in painting and sculpture
Faber & Faber
- Read, Herbert **ART AND INDUSTRY**
A splendid book on the interaction of art and manufacture by our greatest expert on this important subject
Faber & Faber
- Read, Herbert
(Editor) **SURREALISM**
A fully illustrated survey of this movement by leading exponents
Faber & Faber
- Read, Herbert **ART AND SOCIETY**
Deals with the sociological aspects of art, well illustrated
Heinemann
- Wilenski, R H **THE MEANING OF MODERN SCULPTURE**
MODERN MOVEMENTS IN ART
Two well illustrated surveys of modern art by a leading art critic, very informative
Faber & Faber

ARCHITECTURE

- Architectural Press **YOUR INHERITANCE—An uncomic strip**
A lively pamphlet full of wit and information about our country's development through many generations
Architectural Press
- Casson, Hugh **NEW SIGHTS OF LONDON**
An excellent guide to the modern buildings in London
L P T B
- Gibberd, Fredk **THE ARCHITECTURE OF ENGLAND**
A pictorial bird's-eye view from 1066 till now, with terse, lucid text A good beginner's book
Architectural Press

Giedion, S

TIME, SPACE AND ARCHITECTURE

Examines the structural and stylistic changes in architecture brought about by the introduction of new building materials such as steel and concrete
Oxford University Press

• Richards J M

AN INTRODUCTION TO MODERN ARCHITECTURE

A first rate summary, beautifully illustrated and a miracle of cheap book production
Penguin

• Sharp, Thomas

TOWN PLANNING

A splendid short treatment of a complex subject
Penguin

Yorke, F R S and
Penn, Colin

A KEY TO MODERN ARCHITECTURE

Opens up the orthodox modernist's point of view very well
Blackie & Sons

MUSIC

Bacharach Alfred
(Editor)

THE MUSICAL COMPANION

A series of essays by various authors on different aspects of the art of music, including composition and performance
Gollancz

• Abraham, Gerald

THIS MODERN STUFF

An excellent introduction for the general reader presenting no technical difficulties
Archer

Davies, Sir Walford

THE PURSUIT OF MUSIC

This book does not take into account any very new developments, but perpetuates something of the spirit of the author's broadcasts on the cultivation of a love for music in general
Nelson

Dyson, Sir George

THE NEW MUSIC

The most technical of the books enumerated here, but not beyond the ordinary musical reader's comprehension, and a brilliant exposition of various modern tendencies
Oxford University Press

Howes, Frank

A KEY TO THE ART OF MUSIC

An approach for the general reader, dealing with various phases of the art
Blackie

Myers Rollo H

MUSIC IN THE MODERN WORLD

New developments as seen from a personal point of view
Arnold

• Slonimski, Nicholas

MUSIC SINCE 1900

A reference work containing chronological entries of important musical events in the twentieth century, shown year by year
Dent

LITERATURE—POETRY

- Aragon, Louis **LE CREVE CŒUR** and
LES YEUX D'ELSA (In French)
 These poems are simple and moving, written in war-time, but not about war in the sense of politicians or journalists. They present no literary difficulties to anyone who reads French.
Horizon/Hachette France Libre
- Eliot, T S **COLLECTED POEMS**
 Eliot made his name with a poem (*The Waste Land*) so outstanding that many people have not noticed that his later poems have surpassed it.
Faber & Faber
- Eluard, Paul Another French poet who is producing excellent work, his recent poems are shortly to appear in an English edition.
- Hardy, Thomas Hardy's poems, less read during his life than his novels, are among the greatest of this century.
Macmillan
- Lawrence, D H Readers of Lawrence's novels are often less familiar with his poems, that deserve more attention.
Heinemann
- Lorca, Garcia Translated from the Spanish by Gili and Spender. A real poet, better than Mayakovsky.
Heinemann
- Mayakovsky has not yet been adequately translated into English, but Herbert Marshall and others cannot quite obscure by their appalling versions the strong though naive genius of a poet who was much more than the poet of the Bolshevik Bogey.
- Owen, Wilfrid Poet of the last war, who ought to be re-read in this.
Chatto & Windus
- Raine, Kathleen **STONE AND FLOWER**, illustrated by Barbara Hepworth.
Nicholson & Watson
- Rilke, R M has been so well translated by J. Leishmann and Stephen Spender that his quality is quite sufficiently preserved in English to convey his extraordinary greatness. Other translators are to be avoided. Malte Laurids Brigge, translated under the title, in New York, **JOURNAL OF MY OTHER SELF**, and in London, **THE NOTEBOOK OF MALTE LAURIDS BRIGGE**, is semi autobiographical. It should be read after and not before, the *Duino Elegies*, that in turn should be read after and not before some of the simpler lyrics.
Hogarth Press
- Yeats, W B All his poems, especially the later ones. Yeats' autobiography should be read, but after the poems.
Macmillan
- Sitwell, Edith *Duckworth*
 de la Mare, Walter *Constable and Faber & Faber*
 Graves, Robert *Cassell and Faber & Faber*
 Are three of the outstanding older poets.

- Auden, W H is far the best of the younger poets
Faber & Faber
 For the rest, the Faber list is the best guide
- Sponder, Stephen
 Empson W *Faber & Faber*
 MacNeice, Louis *Chatto & Windus*
Faber & Faber
 are included in this list, poets who may all yet produce
 their best .

LITERATURE—PROSE

- Eliot, T S outstandingly the best critic both of literature and of
 contemporary society All his work should be read
 with attention His standpoint is Catholic, Royalist and
 Classicist, in a broad sense
Faber & Faber and Methuen
- Empson, Wm SOME VERSIONS OF THE PASTORAL
 SEVEN TYPES OF AMBIGUITY
 a critic of a more academic kind, difficult but good
Chatto & Windus
- Joyce James DUBLINERS and
 PORTRAIT OF THE ARTIST AS A YOUNG MAN
 are early works, and contain much of Joyce's richness of
 style, without presenting any of the difficulties of the
 later prose
Jonathan Cape
 ULYSSES is perfectly comprehensible to readers with a
 sense of style, and a thorough knowledge of English
 language and literature
Lane
 FINNEGAN'S WAKE
 makes heavier demands, and the reader should have a
 working knowledge of all the main European languages,
 classical and modern, as well as a taste for them, in
 order to enjoy this perhaps prophetic book
Faber & Faber
- Lawrence T E SEVEN PILLARS OF WISDOM, etc.
 (Lawrence of Arabia) *Jonathan Cape*
- Lewis Wyndham THE LION AND THE FOX
 (a pioneer in modern criticism)
Richards Press
- Lowe, Livingstone THE ROAD TO XANADU
 (an interesting piece of American research on Coleridge's
 "Kubla Khan")
Constable
- Proust Marcel REMEMBRANCE OF THINGS PAST

- Read, Herbert takes rather the opposite position from T S Eliot, but his *Anarchism* is on the whole less revolutionary than Mr Eliot's *Catholicism*. All his anthologies are admirable, and so are his two autobiographical books *Faber & Faber* and *Routledge*
- Richards I A **PRINCIPLES OF LITERARY CRITICISM**
an interesting experiment in "Scientific" criticism of poetry
Kegan Paul
- Sitwell, Edith as a critic is delightful both for the enthusiasm of her appreciations and for her battles of wit
Faber & Faber and *Duckworth*
- Roberts Michael starting where T E Hulme ended, is a forceful critic, who tends increasingly to write about society direct, rather than about literature in the narrow sense
THE RECOVERY OF THE WEST is his latest book
Faber and Faber
- Sitwell Osbert *Jonathan Cape*
- Sitwell, Sacheverell *Duckworth and Macmillan*
are admirable stylists, in very different ways
- Waley, Arthur His translations from Chinese poetry and Japanese prose (notably **THE TALE OF GENJI** by Lady Murasaki) are among the outstanding works of English literature of this century, and comparable in excellence with the best Tudor translations of Greek and Latin classics
Allen & Unwin
- Woolf, Virginia *Hogarth Press*
- Lawrence, D H *Heinemann*
- Forster, E M *Arnold*
require no further comment. Forster is certainly the finest English novelist now living

EDUCATION

- Balley **INTERNATIONAL STUDIES IN MODERN EDUCATION**
Chatham House
- Burton, H M **EDUCATION FOR THE COUNTRYMAN**
Interesting and cheerful description of an aspect of education which is often overlooked
International Library of Sociology and Social Reconstruction
London *Kegan Paul*
- Clarke, F **EDUCATION AND SOCIAL CHANGE**
The best short survey of the relation of education to the changing needs of society
Sheldon Press
- Lawrence, W J C **THE YOUNG GARDENER**
Describing how a boy of 15 should set about training himself to become an expert gardener and giving an outline of the knowledge required
Allen & Unwin
- Unklater, Eric **RABELAIS REPLIES**
One of a series called "Conversations in Elysium" which have been broadcast. It contains some brilliant material on education
Macmillan

Thomas & Volsey

FARM AND SCHOOL

Another book to describe new educational methods
Longmans

• Read Herbert

EDUCATION THROUGH ART

Advances the theory that art, as the training of sensibility, should be a basic factor in education. Includes a detailed analysis of the artistic faculties of children. Illustrated—an important book but difficult
Faber & Faber

PHILOSOPHY AND GENERAL

Chase Stuart

THE TYRANNY OF WORDS

Most readable on the side of the modern language theory
Methuen

Dixon, Macneile W

THE HUMAN SITUATION

The work of a Professor of Literature, well written and wide ranging without being technical in any way
Arnold

Taylor, A E

THE FAITH OF A MORALIST

Less sceptical and more professional while still readable
Macmillan

Macmurray, John

INTERPRETING THE UNIVERSE

A discussion of the philosopher's task and the means by which it can be accomplished
Faber & Faber

• Macmurray, John

FREEDOM IN THE MODERN WORLD

A famous series of broadcast talks on philosophy and social questions of the day
Faber & Faber

Macmurray John

PHILOSOPHY OF COMMUNISM

A short and sympathetic comment on Marxist theory for non Marxists with some critical suggestions
Faber & Faber

• Macmurray, John

REASON AND EMOTION

A series of topical essays on subjects involving our emotional life; including education, sex, art and religion
Faber & Faber

Macmurray John

THE STRUCTURE OF RELIGIOUS EXPERIENCE

An account of the origin and significance of religion in human experience—easy to read
Faber & Faber

Macmurray, John

CREATIVE SOCIETY

A simple treatment of the relations between Christianity and Communism
Student Christian Movement Press

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